MONTHLY WEATHER REVIEW.

Editor: Prof. Cleveland Abbe. Assistant Editor: H. H. Kimball.

Vol. XXX. MARCH, 1902. No. 3

INTRODUCTION.

The Monthly Weather Review for March, 1902, is based on reports from about 3,100 stations furnished by employees and voluntary observers, classified as follows: Regular stations of the Weather Bureau, 162; West Indian service stations, 13; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,562; Army post hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Railway Company, 96; Hawaiian Government Survey, 200; Canadian Meteorological Service, 33; Jamaica Weather Office, 160; Mexican Telegraph Service, 20; Mexican voluntary stations, 7; Mexican Telegraph Company, 3; Costa Rican Service, 7. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Hawaiian Government Survey, Honolulu; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Mr. Maxwell Hall, Government Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; Lieut. Commander W. H. H. Southerland, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Institute, San Jose, Costa Rica; Capt. François S. Chaves, Director of the Meteorological Observatory, Ponta Delgada, St. Michaels, Azores; W. M. Shaw, Esq., Secretary, Meteorological Office, London; and Rev. Josef Algué, S. J., Director, Philippine Weather Service.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the Review, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is 157° 30′, or $10^h\ 30^m$ west of Greenwich. The Costa Rican standard of time is that of San Jose, $0^h\ 36^m\ 13^s$ slower than seventy-fifth meridian time, corresponding to $5^h\ 36^m$ west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

Barometric pressures, whether "station pressures" or "sea-level pressures," are now always reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

FORECASTS AND WARNINGS.

By Prof. E. B. Garriott, in charge of Forecast Division.

Several storms of marked intensity moved from the United States coasts northeastward over the Canadian Maritime Provinces, and advanced thence over the Atlantic in high latitudes. During the third decade of the month a succession of areas of low barometric pressure whose centers passed north of Scotland, caused high winds, low temperature, and rain or snow over a great part of the British Isles and along the central and north coasts of western Europe. In the United States energetic storms were numerous. Some of these storms moved rapidly inland from the north Pacific coast, and others first appeared over the Rocky Mountain and Plateau regions, and, as a rule traveled rapidly north of east to the Atlantic coast. The most important storm of the month appeared over Nevada on the morning of the 13th, and moved eastward to Colorado by the morning of the 14th, where, at Denver, the barometer reduced to sea level was 29.10 inches, with one exception the lowest reading reached at that station during March in thirty years. Moving north of east with a gradual loss of strength, this storm reached Lake Superior on the 16th. The severest cold wave and snowstorm of the month followed in its wake, extending over the northern Rocky Mountain region and the middle and northern Rocky Mountain slope during the 14th, advancing over the upper Mississippi Valley and the upper Lake region during the 15th and 16th, and reaching the lower Lake region on the 17th; the cold wave covered the Atlantic coast districts during the 17th. The snow fall was heavy and the cold intense for the season in the States of the upper Missouri Valley, and thence over the middle Rocky Mountain districts. The highest wind velocities of the month occurred in connection with a severe storm which appeared on the north Pacific coast on the 1st. On that date the wind maintained a velocity of over 100 miles an hour for several hours at Point Reyes Light, Cal. During the closing days of March the temperature continued low in the extreme southwest, and on the 25th a remarkable fall occurred in the mountain districts of Arizona, a minimum of —8° being recorded at Flagstaff. Ample warnings were issued in connection with the cold waves and storms of the month in the central and northern districts, and the occurrence of frost was successfully forecast in the Southern States.

The following report has been rendered by the Weather Bureau observer at Wilmington, N. C., relative to warnings issued in that section in advance of the cold wave of the second decade of the month:

In connection with the severe freeze of this section on the morning of the 19th instant every effort was made to get the warnings of damaging

frosts out promptly to as many truckers as possible, and railroads entering this city assisted by telegraphing the information to all their stations. An immense amount of growing stuff, strawberries, lettuce, etc., was protected, and the observer has been informed that many thousands of dollars were saved as a result of the warnings.

In California no damage by frost was reported, and at the close of the month fruit trees were in better condition than is usual at this season. In the north Pacific coast States the month was unusually cool and heavy frosts were frequent during the last of the month.

The month opened with destructive freshets in the rivers and streams of the Appalachian Mountain system, and during the last few days of the month destructive floods occurred in Mississippi, Alabama, Georgia, Tennessee, and Kentucky.

BOSTON FORECAST DISTRICT.

The weather of the month was unusually warm, with excessive precipitation, mostly in the form of rain, and a number of severe windstorms. Warnings were given of the approach of these storms.—*J. W. Smith, Forecast Official.*

NEW ORLEANS FORECAST DISTRICT.

March was unusually stormy, and warnings for high winds were issued on a number of dates. These warnings were timely, and no windstorms occurred without warnings. The cold waves and frosts of the month were also accurately forecast.—*I. M. Cline, Forecast Official.*

CHICAGO FORECAST DISTRICT.

Advisory messages for severe storms were issued from time to time to steamboat companies at the various ports on Lake Michigan where a winter service is maintained. A cold wave crossed the district from the 13th to the 17th. Warnings were sent well in advance of this cold wave, and were completely verified. In the Northwest the cold wave was accompanied by high winds and snow. Advices for these conditions were sent to railroads and other interests.—*H. J. Cox, Professor.*

DENVER FORECAST DISTRICT.

The feature of the month was the unusual number of storms that developed in this district. For only one, however, the the storm of the 14–15th, was it necessary to issue warnings. These warnings were fully justified in Colorado east of the foothills, in western, and the greater part of eastern Wyoming, and practically throughout the area specified west of the mountains.—*F. H. Brandenburg, Forecast Official.*

SAN FRANCISCO FORECAST DISTRICT.

The month was one of unsettled weather, with fairly frequent rain, although the total rainfall for the month was below the average. The month opened with one of the most severe storms experienced for some time in this section. At Point Reyes Light on March 1 a wind velocity of over 100 miles was reported for several hours, with an extreme velocity of 120 miles.

Light and heavy frosts occurred generally in California on the morning of March 4. Ample warning was given and no damage was done to fruit. The month passed without the usual injurious frosts.—*A. G. McAdie, Professor.*

PORTLAND, OREG., FORECAST DISTRICT.

The month was unseasonably cool but not unusually stormy in this district. Sharp frosts occurred frequently in the North Pacific States from the 24th to the 30th, and they were almost without exception accurately forecast.—*E. A. Beals, Forecast Official.*

HAVANA FORECAST DISTRICT.

No general advices were issued during the month. On the 5th the following was telegraphed all regular and display stations in Cuba:

Fresh to brisk and occasionally high southwest wind, shifting to cooler brisk and high northwesterly, this afternoon and to-night over western Cuba, and over eastern Cuba during Thursday.

A daily, except Sunday, wind forecast was furnished the captain of the port of Havana for the information of departing vessel masters.—*W. B. Stockman, Forecast Official.*

AREAS OF HIGH AND LOW PRESSURE.

Movements of centers of areas of high and low pressure.

Number.	First observed. Date.	First observed. Lat. N.	First observed. Long. W.	Last observed. Date.	Last observed. Lat. N.	Last observed. Long. W.	Path. Length.	Path. Duration.	Average velocity. Daily.	Average velocity. Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	2, p.m.	37	123	8, a. m.	32	65	4,625	5.5	841	35.0
	3, p.m.	53	108				3,725	4.5	828	34.5
II	5, p.m.	53	108	10, a. m.	47	54	2,775	4.5	617	25.7
III	7, a.m.	35	120	13 a. m.	32	65	3,600	4.0	900	37.5
IV	12, p.m.	36	106	17, a.m.	47	54	3,575	4.5	794	33.1
V	15, p.m.	54	113	20, a.m.	48	86	2,675	4.5	594	24.8
Sums							20,975	27.5	4,574	190.6
Mean of 6 paths							3,496		762	31.8
Mean of 27.5 days									763	31.8
Low areas.										
I	1, p.m.	32	81	5, a. m.	47	54	2,100	3.5	600	25.0
II	1, p.m.	35	120	6, a. m.	45	64	4,400	4.5	978	40.8
III	5, p.m.	45	123	10, a.m.	45	64	3,750	4.5	833	34.7
IV	9, p.m.	37	105	14, a.m.	47	54	3,500	4.5	778	32.4
V	12, a.m.	52	122	17, a. m.	48	68	3,950	5.0	790	32.9
VI	14, a.m.	51	120	15, a. m.	42	113	700	1.0	700	29.2
VII	19, a.m.	37	114	21, p. m.	32	91	1,500	2.5	600	25.0
VIII	24, a.m.	37	114	27, p. m.	50	97	1,550	3.5	443	18.4
IX	27, a.m.	27	97	30, a. m.	45	67	2,250	3.0	750	31.2
X	29, a.m.	32	100	1, a. m.*	48	68	1,975	3.0	658	27.4
Sums							25,675	35.0	7,130	297.0
Mean of 10 paths							2.568		713	29.7
Mean of 35.0 days									731	30.5

*April.

For graphic presentation of the movements of these highs and lows see Charts I and II.—*Geo. E. Hunt, Chief Clerk, Forecast Division.*

RIVERS AND FLOODS.

During the early days of the month the ice in the upper Mississippi River moved out quietly, the dates at the various stations being as follows: At St. Paul, Minn., La Crosse, Wis., and Leclaire, Iowa, on the 9th; at Prairie du Chien, Wis., and Dubuque, Iowa, on the 11th; at Davenport, Iowa, on the 5th; at Keokuk, Iowa, on the 4th, and at Hannibal, Mo., on the 5th.

Navigation, however, was not generally opened as the early movement of the ice had not been anticipated. In the lower Mississippi the stages were much higher, owing to the Ohio River flood of the early days of the month and the torrential rains from the 26th to the 28th, but danger-line stages were not quite reached. The Missouri River, from the mouth of the Platte northward, opened generally from the 5th to the 12th, and the ice passed quietly down the river. For a few days, however, gorges above Yankton, S. Dak., caused conditions to assume a very threatening aspect. Moderate water stages prevailed during the remainder of the month.

In the Ohio River and the rivers of the East and South flood stages were the rule, particularly in the East, where the floods attained proportions such as, with but a single exception, had never before been recorded.

On February 16 the depth of snow over the Ohio and the eastern river valleys ranged from 3 to 10 inches, while over the Allegheny Mountains as far south as North Carolina it was considerably greater. About the 22d of February indications of higher temperatures were such that a general thaw seemed imminent over the entire section, and the following preliminary warning was issued from the Central Office:

Conditions in rivers and mountain streams of Pennsylvania considered critical. Present conditions do not indicate cooler weather, and ice gorges may cause flooding of low-lying lands.

During the 22d the indications of warmer weather and rain became more pronounced, and on the 23d a supplementary warning was sent as follows:

Warmer weather indicated for next two days, with conditions favorable for rain Monday night. These conditions will be most favorable for a general breaking up of ice in the mountain rivers and streams of Pennsylvania, western Maryland, and West Virginia. Notify all interests concerned that danger from flood in low-lying land is imminent.

During the two succeeding days the high temperatures caused the snow to melt with great rapidity, and the water quickly found its way into the streams. A short time after this rain began to fall. It was heavy at times, and continued with but short intervals until nearly the middle of March.

In the Ohio River not much damage was done, although the danger line was exceeded from Parkersburg, W. Va., to the mouth of the Kentucky River. The most critical situations were encountered at Pittsburg and along the Susquehanna, Lehigh, Delaware, and Potomac rivers. At Pittsburg the situation for a whole week was most alarming. Lying between two large mountain rivers, both gorged with ice many feet in thickness, with the temperature rising, and rain frequently falling, it was impossible to foretell when the immense mass of ice would be released by the heat and rush down upon the city. If both rivers opened together, with a heavy rain, there would result a flood beyond all records, with enormous damage by ice and overflow, and very probably loss of life. Very fortunately the ice moved out of the Monongahela River on the 25th without gorging, greatly relieving the situation. That in the Allegheny River held until the 28th, when it also moved out on a rapidly rising river caused by melting snows on the mountains. From 8 a. m. February 28, to 6 p. m. March 1, the river on the Pittsburg gage rose from 13.1 feet to 32.4 feet, 10.4 feet above the danger line. At 8 p. m. the waters began to recede. Beginning with the 22d of February, as before stated, warnings of the coming flood had been given, and they were repeated frequently, with more accurate details until all danger had passed. As had been expected, much damage was done to property that could not be moved; nevertheless, property to the value of millions of dollars was saved by care and removal, and the warnings were highly commended on all sides. The warnings issued on the Ohio River to its mouth, although predicting more moderate floods, also proved of great value to farmers and lumbermen, as indicated by the many letters of commendation and thanks that have been received. A peculiar feature of this flood was the prolonged crest below Parkersburg, W. Va., due to the steady supply of water from the slow melting of the heavy snows of March 4 and 5. The Tennessee River contributed her usual quota to the flood history. Affected by the same general conditions that caused the Ohio and other floods of the East and South, the tributary streams rose rapidly on February 27 and 28, and on the latter date the head waters of the French Broad River were reported higher than ever before known. Warnings were promptly issued. They were repeated on March 1, and again on the 2d, with the information that a stage of between 36 and 38 feet might be expected at Chattanooga, Tenn. Lower Tennessee interests were also notified to this effect. The maximum stage reached was exactly 38 feet on the morning of March 4, being 5 feet above the danger line. The lower river warnings issued from Cairo, Ill., were also in excellent season, and equally accurate. The maximum stages averaged about 5 feet above the danger lines. The crest of this flood was also long drawn out, owing to the slow melting of the heavy snow of the 4th over the headwaters. At Johnsonville, Tenn., the river continued to rise for nearly ten days after the fall set in at Chattanooga. There was not much damage done below Knoxville, Tenn., but above that place the losses were very heavy. On the Knoxville division of the Southern Railway the damage to roadbed and bridges alone amounted to from $200,000 to $250,000.

In the upper Cumberland River the stages ranged from 10 to 15 feet above danger lines, with a maximum stage of 65 feet at Burnside, Ky., being 3 feet above the previous record of 62 feet on March 31, 1886. In the lower river the stages were lower, averaging about 5 feet above the danger lines. The Susquehanna, Lehigh, and Delaware floods were the greatest of this period. As no river service is maintained on the two latter rivers, no detailed report can be given as to the damage. The flood was the greatest for a generation. An inspection over one month afterward of the territory covered afforded unmistakable evidence that the damage must have been most appalling. It is impossible to give any estimate in figures. The railroads lost many millions, and the losses of each individual community along the rivers ranged from thousands almost to millions of dollars. The following is an extract from a report on the Susquehanna flood:

The flood of March 2, 1902, was the fourth in point of magnitude that has occurred in the recorded history of the Susquehanna River. Considered from the standpoint of the amount of damage done to property, it probably stands second, if not first, in importance. The greatest flood on record, that of 1889, occurred on June 2, and consequently there was no ice to add to the damage done by the high water. It is probable that the damage done by the ice which came down on the flood of March 1 and 2 was greater, especially at Harrisburg, Pa., than in any flood during the past hundred years. * * * It is impossible to express in figures the amount of damage done, as the extent of the havoc caused by the high water, ice, and logs is so widespread and affects so many people and industries that it can never be determined. If the value of the property damaged and destroyed by this flood could be stated in dollars, it is probable that the amount would be so enormous as to be almost beyond belief.

The flood in the Potomac did not attain more than moderate proportions below the mouth of the Shenandoah River, and the damage was comparatively slight. The stages, however, were the highest since the famous flood of June 2, 1889. In the vicinity of Washington, D. C., the breaking of the ice by a fleet of steamers prevented a severe flood that must have otherwise resulted from gorges that would have formed at the Long Bridge. Along the upper Potomac, including Harpers Ferry, W. Va., the conditions were much different, and there was great destruction of property, especially of railroad beds and bridges. At Cumberland, Md., no trains arrived from the East for sixty hours, and much of the business portion of the town was inundated. The old Chesapeake and Ohio Canal suffered severely from washouts of its towpath and breaks in its dams. At Harpers Ferry on the evening of March 1 communication in the down town districts was possible only in boats.

The James River flood crested at 19 feet at Richmond, Va., on March 2, 7 feet above the danger line. Its coming had been foretold at the proper time, and no damage resulted that could have been averted. The docks and lower floors of warehouses near the river were flooded, street car service was interrupted and river traffic brought to a standstill. The flood continued until the morning of March 4.

The Roanoke River was above the danger line from February 26 to March 4, inclusive, with a maximum stage of 38.9 feet at Weldon, N. C., on March 1, 8.9 feet above the danger line. Warnings for a 40-foot stage were issued on February 25, a very close approximation of the stage actually reached. Supplementary warnings for the moderate flood in the Cape Fear River were also issued on February 28.

The first warnings for the South Carolina floods were issued

on February 25 for flood stages in the Great Pedee and Wateree rivers, and the danger lines were passed on the following day. There was a slight recession on the 27th, but additional heavy precipitation on the last two days of the month necessitated a supplementary warning on the 28th that a second flood was following close upon the first, and that a further rise might be expected by March 1. Warnings for the lower rivers were issued when necessary, including a well verified general forecast that the high water in the lower Pedee and the Santee rivers would continue until March 15.

The Savannah River flood lasted from March 1 to 3, inclusive, with a maximum stage on the 1st, at Savannah, Ga., of 34.6 feet, 2.6 feet above the danger line. Warnings of a 34-foot stage were issued on February 28. The warnings for the Chattahoochee River were also issued on this day, and the stages ranged from the danger line of 20 feet at Westpoint, Ga., to 16 feet above at Eufaula, Ala.

The first practical flood work of the new Macon, Ga., river district resulted in a saving of about $125,000 to the various business interests along the Oconee, Ocmulgee, and Altamaha rivers. The first warnings were issued on the evening of February 27, and they were continued almost daily until the flood wave had receded. The warnings were accurate and well timed, and the service has been the subject of much favorable comment from those interested.

The first warnings for the Alabama River district were issued on February 27, and second ones on the 28th for still higher stages. That the warnings had the desired effect is evidenced from the following comment published in the Montgomery, Ala., Advertiser of March 4, 1902:

When it is remembered that the stages were quite low when the local office of the Weather Bureau issued its flood warnings, and that its estimates so well in advance of the flood crest have been so accurately verified, it increases the general confidence in this feature of the Bureau's work, which is of direct interest to various important interests along the rivers. As the milling, live stock, and lumbering interests alone that are affected by the floods in the Coosa and Alabama and tributaries approximate well up in the millions in value, the importance of such timely and well-distributed warnings can be appreciated.

Other press notices were equally commendatory.

The stages in the Tombigbee and Black Warrior rivers were several feet above the danger lines without unusual incident. Warnings were issued on February 28.

On the Pacific coast the crest of the Sacramento River flood reached the city of that name on March 1, with a stage of 28.2 feet, 3.2 feet above the river danger line. A warning of this rise was issued on February 25, and thereafter there was a rise of about 1 foot a day until the crest was reached. The direct loss to buildings, stock, and movable property was small, as the warnings were timely and widely distributed, but the losses of crops and fruit lands caused by the escape of the waters through broken levees were very large.

There was still another flood over the southern rivers during the closing days of March, continuing into the first few days of April, and general warnings were once again in order. Over the middle portion of the Tennessee River great damage was done. At the Muscle Shoals Canal the loss to the Government works was about $150,000, and navigation will be suspended until repairs can be made. It is estimated that the total losses in the State of Tennessee by the floods of the month were $5,235,000, and 25 lives were reported as lost. In the south Atlantic rivers the later floods were not pronounced, but in Alabama and Mississippi they were abnormal, ranging generally from 13 to 20 feet above the danger lines. At Montgomery, Ala., the Alabama River reached a stage of 47.8 feet, 12.8 feet above the danger line, while at Tuscaloosa, Ala., the Black Warrior River reached a stage of 55.6 feet, 20.6 feet above the danger line. The damage resulting from this flood was very heavy, particularly in the central portion of the State of Alabama. Much land was badly washed and the railroads suffered severely. The estimated losses amount to over $300,000. In eastern and southern Mississippi the destruction, as shown by press despatches, was even greater, though no reliable estimate could be obtained.

On March 10, 1902, the river and flood service of the new Knoxville, Tenn., district was inaugurated with territory comprising the Holston and French Broad rivers and their tributaries. The special river stations of the district are located at Bluff City and Rogersville, Tenn., on the Holston River, and at Marshall, N. C., and Leadvale and Sinking Springs, Tenn., on the French Broad River. In addition to these, rainfall stations are also operated at Elizabethton, Greenville, and Newport, Tenn., and Mendota, Va.

The highest and lowest water, mean stage, and monthly range at 139 river stations are given in Table VII. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are: Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati, and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Forecast Official.*

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Divison.

The following summaries relating to the general weather and crop conditions are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau:

[Temperature is expressed in degrees Fahrenheit and precipitation in inches and hundredths.]

Alabama.—The mean temperature was 55.1°, or about normal; the highest was 82°, at Bermuda on the 25th, and the lowest, 17°, at Valley Head on the 18th. The average precipitation was 8.76, or 2.54 above normal; the greatest monthly amount, 14.14, occurred at Livingston, and the least, 5.31, at Thomasville.

Excessive rains and damaging floods; farm work very backward; corn land about one-third prepared, very little planted; only slight preparation for cotton.—*F. P. Chaffee.*

Arizona.—The mean temperature was 50.9°, or 4.7° below normal; the highest was 92°, at Parker on the 31st, and the lowest, 8° below zero, at Flagstaff on the 26th. The average precipitation was 0.59, or 0.32 below normal; the greatest monthly amount, 2.72, occurred at Flagstaff, while none fell at Fort Mohave.

The weather was characterized by high, drying winds, abnormally low temperature, and deficient rainfall. The mean temperature as compared with the preceding three years was low, the deficiency ranging from 3° to 8°. Vegetation was not seriously injured in the lower agricultural valleys, but plant growth was arrested by the adverse conditions. Precipitation in the form of rain or snow was general during the last decade, and there was a marked increase in the water flow in the irrigating streams.—*Wm. G. Burns.*

Arkansas.—The mean temperature was 62.6°, or 1.3° above normal; the highest was 89°, at Texarkana on the 26th, and the lowest, 14°, at Dutton, Pond, Oregon, and Winslow on the 18th. The average precipitation was 5.34, or about normal; the greatest monthly amount, 9.37, occurred at Helena, and the least, 2.35, at La Crosse.

Cold, wet weather during the first half of the month was unfavorable for farming operations and work was greatly retarded; more favorable conditions prevailed during the last half of the month and work was pushed and advanced rapidly; the ground generally was in good condition for plowing and much had been done, though farming operations were generally about two weeks late. No corn or cotton had been planted. Early sown wheat and oats had improved, but the late sown were not doing so well, especially oats, many fields of which will be plowed up and the ground prepared for spring crops. Fruit trees had commenced to bud, and up to the close of the month had suffered no damage.—*Edward B. Richards.*

California.—The mean temperature was 49.7°, or 2.1° below normal; the highest was 90°, at Tulare on the 30th and at Volcano on the 31st, and the lowest, 16° below zero, at Boca on the 23d. The average precipitation was 3.39, or 0.13 above normal, the greatest monthly amount, 13.82, occurred at Cuyamaca, and the least, 0.05, at Needles.

Conditions during the first half of the month were unfavorable for growing crops, the cool weather retarding growth of grain and grass, but no material damage occurred. During the latter part of the month warmer weather and showers were very beneficial. Grain is in excellent condition and heavy crops are almost assured. Deciduous fruits are in full bloom and have not been seriously injured by frost.—*Alexander G. McAdie.*

Colorado.—The mean temperature was 34.3°, or about normal; the highest was 78°, at Lamar on the 19th, and the lowest, 23° below zero, at Gunnison on the 5th. The average precipitation was 1.09, or 0.12 below normal; the greatest monthly amount, 3.87, occurred at Ruby, and the least, trace, at Garnett.

The prevailing weather conditions during March were favorable for farm work, but owing to the fact that the open winter had left the soil unusually dry, operations were carried on under a great disadvantage. There was some local improvement as regards moisture during the last decade of March, and at the close of the month seeding and planting were generally as far advanced as usual, except in the south-central section and on the Arkansas-Platte Divide. The reports indicate that as a rule winter wheat is in good condition and that fruit trees sustained no serious damage during the winter. At the close of the month the majority of trees were near the normal stage of advancement.—*F. H. Brandenburg.*

Cuba.—The mean temperature was 74.4°, or about normal; the highest was 97°, at Santa Gertrudis (Banaguises) on the 30th and 31st, and the lowest, 42°, at San Antonio (Santa Clara) on the 19th. The average precipitation was 1.56; the greatest monthly amount, 9.15, occurred at Manzanillo, while none fell at Moron.

The temperature was quite variable, but the monthly mean was about normal. The rainfall was very unevenly distributed, and in most instances insufficient for young canes and ratoons, although in a few localities it was heavy enough to prevent cane carting and thereby interfered with grinding. The sugar crop will fall considerably short of estimates. Fair progress was made with cultivation of new canes and preparations for spring planting, but attention given the work was not general. Second growth of tobacco in Pinar del Rio and Havana provinces gave a very good yield, but at the end of the month the return from this crop was proving very poor in Santa Clara Province. Small crops made fair progress, but were in general need of rain at the end of the month.—*W. B. Stockman.*

Florida.—The mean temperature was 64.8°, or 0.6° below normal; the highest was 91°, at Bartow on the 12th and 14th, and the lowest, 28°, at Wausau on the 6th and at Middleburg on the 7th. The average precipitation was 4.63, or 1.55 above normal; the greatest monthly amount, 13.62, occurred at De Funiak Springs, while none fell at Flamingo and Miami.

The month was slightly cooler than the average, with precipitation (all sections considered) above the normal, although rain was decidedly light through portions of the central district, and uniformly so in the southern section of the State. The bulk of the corn crop was planted during the second decade and a large acreage was planted to cotton during the third decade. Early corn and melons made fair progress, although low temperatures during the first decade checked growth and caused some corn to turn yellow. Citrus trees are in fair condition, with good bloom in evidence. Pineapples suffered no serious drawbacks. At the close of the month vegetables from southern and central districts were being shipped in large lots. Farm work is generally well advanced.—*A. J. Mitchell.*

Georgia.—The mean temperature was 55.0°, or 0.7° below normal; the highest was 86°, at Mauzy and Waverly on the 30th, and the lowest, 13°, at Diamond on the 19th. The average precipitation was 7.91, or 2.65 above normal; the greatest monthly amount, 13.40, occurred at Blakely, and the least, 4.62, at Waynesboro.

March was the eighth consecutive month with temperatures below normal, although in this instance the departure was less than one degree. The most noteworthy feature, however, was the precipitation element, which was decidedly above normal in all sections of the State. The total monthly falls were heavy in the southwestern counties, averaging more than 10 inches, with over 13 inches recorded at two stations. The general conditions of the month were unfavorable to agricultural interests. Plowing and planting were retarded by the excessive rainfall, and at the close of the month the season was regarded as fully two to three weeks later than usual.—*J. B. Marbury.*

Idaho.—The mean temperature was 33.5°, or 0.8° below normal; the highest was 72°, at Lewiston on the 31st, and the lowest, 14° below zero, at Lake on the 30th. The average precipitation was 1.38, or 0.30 below normal; the greatest monthly amount, 3.33, occurred at Silver City, and the least, 0.20, at Blackfoot.

The weather during March was uniformly cool throughout the southern and central sections and moderately mild in the northern counties. It was the most unfavorable month for vegetation since March, 1899; however, much plowing and some seeding of spring wheat and oats were done. Owing to frequent snowstorms in the mountains, the outlook for irrigation water during the approaching crop season is very good—better than for three years.—*S. M. Blandford.*

Illinois.—The mean temperature was 43.0°, or 4.3° above normal; the highest was 77°, at Centralia, Cisne, and Equality on the 25th, and the lowest, 4° below, at Chemung on the 17th. The average precipitation was 3.36, or 0.10 above normal; the greatest monthly amount, 5.51, occurred at Joliet, and the least, 1.30, at Effingham.

Moderately warm weather prevailed the greater part of the month, and the latter part was unseasonably warm, except a few days at its end. A cold wave crossed the State about the middle of the month. Good rains fell over most of the State. They have generally been sufficient to put the ground in excellent condition for tillage. As a result of the favorable conditions the agricultural situation at the end of the month is very promising. Wheat has made considerable improvement especially in the southern district. Grasses have also improved somewhat. Oat seeding has progressed rapidly, and some gardening and potato planting have been done. The prospects for fruit, except peaches, seem good.—*M. E. Blystone.*

Indiana.—The mean temperature was 43.6°, or 4.1° above normal; the highest was 80°, at Washington on the 25th, and the lowest, 4°, at Winamac on the 17th and 18th. The average precipitation was 3.11, or 0.88 below normal; the greatest monthly amount, 4.52, occurred at Hammond, and the least, 1.42, at Franklin.

At the end of March wheat was generally short, and in some localities on hill and clay land had been winter-killed in spots; but, as a rule, fields were green and a fair crop seemed assured. Much clover and timothy seeded in the fall failed of a good stand on account of the drought, but meadows that were in good condition in the fall look promising. Peaches suffered in all sections, and in some localities all buds were dead; other fruit is believed to be uninjured. Feed was getting scarce and cattle were reported thin, but otherwise live stock was in good condition. Plowing, sowing oats, planting potatoes, and making gardens were in progress.—*W. T. Blythe.*

Iowa.—The mean temperature was 39.1°, or 5.9° above normal; the highest was 79°, at Winterset on the 25th, and the lowest, 12° below zero, at Estherville on the 17th. The average precipitation was 1.45, or 0.30 below normal; the greatest monthly amount, 4.33, occurred at Cumberland, and the least, 0.13, at Algona.

The month was generally warm and dry, and the soil was in good condition for farm operations at an earlier date than usual in this latitude. Seeding of spring wheat was about complete at close of the month, and good progress was made in sowing oats and barley, and plowing for corn. Fall wheat wintered fairly well, but growth was retarded by dry weather.—*John R. Sage.*

Kansas.—The mean temperature was 45.7°, or 4.4° above normal; the highest was 83°, at Delphos on the 10th, and the lowest, 1° below zero, at Achilles on the 17th. The average precipitation was 1.88, or 0.35 above normal; the greatest monthly amount, 5.11, occurred at Columbus, and the least, 0.30, at Concordia.

Wheat improved rapidly the last ten days, and with few exceptions was in fair condition in the central counties and in fine condition in the eastern. Oat sowing well along in the northern counties and completed in the southern. Corn planting begun in the south. Early potatoes mostly planted. Flax sowing south. Peaches and apricots beginning to bloom south. Peach buds mostly killed north.—*T. B. Jennings.*

Kentucky.—The mean temperature was 47.2°, or 1.3° above normal; the highest was 82°, at Burnside on the 25th, and the lowest, 7°, at Loretto on the 6th. The average precipitation was 4.44, or 0.92 below normal; the greatest monthly amount, 9.68, occurred at Alpha, and the least, 1.26, at Carrollton.

Wheat greatly improved, but is very poor in many central and eastern localities. Tobacco beds were sown, but are generally late. The reports on fruit are very conflicting; some say that peaches are killed, and others claiming that while certain varieties are badly injured, there is a chance for a fair crop. Other fruits promising. Oat sowing and garden planting progressed fairly well during the latter part of the month, but farm work is somewhat backward. Many lambs were killed by the severe weather during the early part of the month, but stock is generally in fair condition.—*H. B. Hersey.*

Louisiana.—The mean temperature was 60.7°, or about normal; the highest was 89°, at Schriever on the 24th, and the lowest, 21°, at Farmerville on the 17th. The average precipitation was 5.03, or 0.60 above normal; the greatest monthly amount, 14.34, occurred at Farmerville, and the least, 1.35, at Lakeside.

Heavy rains over the northern portion of the State materially interfered with farming operations. Preparations for cotton planting made very little progress, except over the southern portion of the State, where planting was progressing in some localities. Corn planting was well advanced over the southern portion of the State and was under way over the northern portion at the close of the month. Planting of sugar cane was retarded to some extent by rain, but was completed in most sections, and both plant and stubble cane were coming up nicely. The weather was generally favorable in the rice growing section and good

progress was made with this crop. Truck gardens made good growth. Strawberries were doing well.—*I. M. Cline.*

Maryland and Delaware.—The mean temperature was 44.8°, or 4.0° above normal; the highest was 80°, at Chewsville, Md., on the 29th, and the lowest, 3°, at Sunnyside, Md., on the 18th. The average precipitation was 3.91, or 0.21 above normal; the greatest monthly amount, 5.92, occurred at Clear Spring, Md., and the least, 1.82, at Pocomoke, Md.

Wet weather prevailed during the early part of the month, with heavy snows on the 5th. Farming operations were interrupted for the most part until about the 17th, when ten days of warmth and sunshine began. During this period slight progress was made in the extreme west; in the interior much clover and some oats were sown, and in the south and east, where the season was most forward, early trucking was well advanced and tobacco beds were made and some seeded. There was a wonderful improvement in wheat and rye in all districts, although those crops were still below average condition at the close of the month. The fruit prospects are very encouraging. Farm work is generally late, as heavy and general rains followed the dry period of the 17th to 27th, again interrupting plowing and gardening.—*Oliver L. Fassig.*

Michigan.—The mean temperature was 36.3°, or 9.0° above normal; the highest was 74°, at Owosso on the 30th, and the lowest, 7° below zero, at Thomaston on the 4th, at Humboldt on the 5th, and at Gaylord on the 18th. The average precipitation was 2.54, or 0.40 above normal; the greatest monthly amount, 6.22, occurred at Vassar, and the least, 0.01, at Newberry.

March was unusually warm and quite dry in all sections until the last decade, when ample showers occurred over the greater portion of the lower peninsula; the month was dry throughout in the upper peninsula. The weather was pleasant most of the month, and at its close plowing had quite generally begun in the central and southern sections. Winter wheat made very little growth during the month, continuing small, but at the close of the month was in a healthy and generally fair condition. Fruit buds seem to have wintered well, and in nearly all sections all kinds of fruit trees were in a promising condition.—*C. F. Schneider.*

Minnesota.—The mean temperature was 34.0°, or 9.0° above normal; the highest was 72°, at Luverne on the 27th, and the lowest, 20° below zero, at Tower on the 16th. The average precipitation was 0.92, or 0.50 below normal; the greatest monthly amount, 4.85, occurred at Beardsley, and the least, 0.09, at Bird Island.

Little or no work is said to have been possible in the timber regions during the month because of the mild weather. At the close of the month the whole Red River Valley was still wet, and no work had been done; in the southern half of the State considerable preparation for seeding had been made and some wheat seeded, and in the central-southern portion wheat seeding was well advanced, a few oats sown, some gardening done, and potatoes planted in one or two cases. In the southern half the soil was in excellent condition, except in the extreme southeast, where it was too wet. Very high winds on the 26th and 27th caused soil drifting in some places. It is still too early to determine the condition of winter rye and the small area of winter wheat.—*T. S. Outram.*

Mississippi.—The mean temperature was 57.1°, or 0.6° above normal; the highest was 85°, at Waynesboro on the 25th, and the lowest, 19°, at Ripley on the 6th. The average precipitation was 9.18, or 3.53 above normal; the greatest monthly amount, 15.34, occurred at Agricultural College, and the least, 3.84, at Woodville.

Up to the 25th of March generally favorable conditions prevailed for clearing the land, plowing and truck gardening, and fair progress was made in farming operations. Oats were sown and in the southern counties were coming up to good stands. In the central and southern portions of the State corn planting was well under way. The very excessive rains on the 26th, 27th, and 28th over the northern two-thirds of the State proved very disastrous to all crops, and as a result a large part of the corn planted during the month was either washed away or covered too deep to germinate; gardens were injured, and in many counties it became necessary to replow the soil that had been prepared for planting. At the close of the month the outlook for fruit was excellent.—*W. S. Belden.*

Missouri.—The mean temperature was 45.4°, or 3.7° above normal; the highest was 85°, at Desoto on the 10th, and the lowest, 1°, at Conception and Maryville on the 17th. The average precipitation was 3.50, or about normal; the greatest monthly amount, 7.67, occurred at Mount Vernon, and the least, 0.46, at St. Joseph.

Except in some of the southern counties, where heavy rains kept the ground too wet to work, the weather was generally favorable for farming operations and for the growth of grains and grasses. In a majority of the central and northern counties the soil was in good condition, the bulk of the oat crop sown, considerable gardening done, many early potatoes were planted, and some ground prepared for corn; but in portions of the southern section the soil was so wet that little planting could be done. Winter wheat continued in good condition, as a rule, and in many counties its condition at the close of the month was much above the average.—*A. E. Hackett.*

Montana.—The mean temperature was 31.4°, or 1.5° above normal; the highest was 62°, at Crow Agency on the 8th, and the lowest, 22° below zero, at Wibaux on the 17th. The average precipitation was 0.80, or 0.38 below normal; the greatest monthly amount, 2.90, occurred at Glendive, and the least, trace, at Fort Benton and Chester.

Severe weather occurred over the east portion of the State from the 14th to the 17th, consisting of heavy snow and high winds, with the temperature below zero during the mornings. All traffic on the railroads was suspended and many sheep and cattle perished. One stockman lost 3,000 head of sheep out of a band of 7,000 in the vicinity of Wibaux, and 40 head of cattle were also lost near Wibaux.—*E. J. Glass.*

Nebraska.—The mean temperature was 39.2°, or 5.0° above normal; the highest was 84°, at Republican on the 10th, and the lowest, 12° below zero, at Madrid and Valentine on the 17th. The average precipitation was 1.18, or 0.02 above normal; the greatest monthly amount, 3.09, occurred at Hay Springs, and the least, 0.18, at Winnebago.

Warm, favorable month; considerable acreage of oats sown in southern counties and a few potatoes planted. Winter wheat continues to look well, and in the western portion of the wheat belt is in exceptionally good condition; in southeastern counties wheat has been injured slightly by dry weather and high wind.—*G. A. Loveland.*

Nevada.—The mean temperature was 35.2°, or 2.9° below normal; the highest was 69°, at Candelaria on the 16th, and the lowest, zero, at Ely on the 3d. The average precipitation was 1.47, or 0.17 above normal; the greatest monthly amount, 5.40, occurred at Eureka, while none fell at Hawthorne.

The first few days were unusually stormy, with high winds and heavy snowfall over the eastern, western, central, and northern sections of the State. At the close of the month the stock of snow in the mountain ranges was sufficient to supply a good flow of water during the summer months. In the western and southern sections of the State some plowing was done during the latter part of the month. The weather was favorable to live stock interests.—*J. H. Smith.*

New England.—The mean temperature was 38.8°, or 7.8° above normal; the highest was 69°, at Boston, Mass., on the 12th, and the lowest, 6° below zero, at Berlin Mills, N. H., on the 7th and 8th. The average precipitation was 5.87, or 2.35 above normal; the greatest monthly amount, 14.37, occurred at Bar Harbor, Me., and the least, 1.74, at Manchester, Vt.

The weather of the month was exceptionally favorable for farm operations. The frost had left the ground by the 15th to 20th, except in some of the northern sections, and plowing and planting has begun in southern sections of the district. Grass and grain have wintered well, except in parts of Connecticut. The general outlook for fruit is very encouraging. The season has been excellent for maple sugar, and the yield is large and the quality first class. The season is fully two weeks in advance of the average. The temperature was much above the normal, making the month unusually mild. The precipitation was largely in excess and chiefly in the form of rain.—*J. W. Smith.*

New Jersey.—The mean temperature was 43.9°, or 5.5° above normal; the highest was 77°, at Beverly and Salem, on the 29th, and the lowest, zero, at Layton on the 7th. The average precipitation was 4.34, or 0.45 above normal; the greatest monthly amount, 7.20, occurred at River Vale, and the least, 3.16, at New Egypt.

Farming operations were begun in the southern section about the 15th, and much seeding and planting of early truck have been done. Some oats seeded in southern and middle sections. Grain and grass fields are below the average stand.—*Edward W. McGann.*

New Mexico.—The mean temperature was 40.9°, or 3.0° below normal; the highest was 85°, at Carlsbad on the 2d, and the lowest, 1° below zero, at Winsors on the 1st. The average precipitation was 0.36, or 0.10 below normal; the greatest monthly amount, 1.62, occurred at Folsom, while none fell at Gage, Los Lunas, and San Marcial, and only a trace at Albuquerque, Deming, East Las Vegas, Lordsburg, Olio, Socorro, and Strauss.

Unusually windy and a cool, dry month. Plowing and planting somewhat backward on account of the drought. Frost on 30th killed most of the apricots and some peaches in the central Rio Grande Valley. As a rule stock is in good condition.—*R. M. Hardinge.*

New York.—The mean temperature was 37.9°, or 7.8° above normal; the highest was 71°, at Fayetteville on the 29th, and the lowest, 2° below zero, at Axton on the 5th. The average precipitation was 3.62, or 0.24 above normal; the greatest monthly amount, 9.40, occurred at Adirondack Lodge, and the least, 0.90, at Lyndonville.

March was a mild month, and snow had disappeared by the 15th. Wheat, rye, grasses, and fruit trees were reported in good condition. The season at the close of March was about ten days in advance of the average, and the conditions were favorable for maple sugar interests. Some plowing for potatoes and oats, and some gardening were done during the latter part of March.—*R. G. Allen.*

North Carolina.—The mean temperature was 50.1°, or 1.5° above normal; the highest was 87°, at Sloan on the 30th, and the lowest, 4°, at Linville on the 18th. The average precipitation was 3.81, or 0.80 below normal; the greatest monthly amount, 10.90, occurred at Highlands, and the least, 1.86, at Kittyhawk.

March did not present marked departures from the normal in temperature or precipitation. While rain in small amounts was frequent, high winds dried out the soil rapidly. There was only one severe cold wave, which culminated on the 19th in the lowest temperatures for the month, but vegetation was not sufficiently advanced to be injured, except truck

crops in the eastern part of the State, which received adequate protection. Open weather gave an impetus to farm work; plowing began actively and much was accomplished. Winter wheat improved considerably. Some upland corn was sown, gardens were prepared, irish potatoes and truck crops planted, tobacco beds seeded, and an increased acreage sown to spring oats. At the close of March fruit trees, chiefly peaches, plums, and cherries were in bloom; the outlook for strawberries and truck crops was excellent.—*C. F. von Herrmann.*

North Dakota.—The mean temperature was 27.4°, or 9.8° above normal; the highest was 65°, at Wahpeton on the 10th and the lowest, 25° below zero, at Bottineau, McKinney, and Woodbridge on the 17th. The average precipitation was 2.73, or 1.79 above normal; the greatest monthly amount, 6.26, occurred at Edgeley, and the least, 0.51, at McKinney.

The most important feature of the month was a severe storm, usually locally termed a "blizzard," on the 14th, 15th, and 16th. During this storm three lives are known to have been lost and the damage to live stock was very great, the full extent of which is not yet known. All travel was suspended and railroads had much difficulty in opening their lines for traffic.—*B. H. Bronson.*

Ohio.—The mean temperature was 41.9°, or 3.4° above normal; the highest was 82°, at Pomeroy on the 11th, and the lowest, 4° below zero, at Cambridge on the 6th. The average precipitation was 2.76, or 0.62 below normal; the greatest monthly amount, 4.96, occurred at Wauseon, and the least, 1.47, at Cincinnati.

The temperature for the month was above the normal, the highest occurring at most stations on the 11th, 12th, or 26th, and the lowest on the 6th or 18th. The precipitation was slightly below normal, the lightest fall being recorded in the southwest and northeast counties. Heavy snow fell in the southeast portion of the State on the 5th, several stations reporting 12 inches or more. Wheat has shown a marked improvement during the month. Farm work progressed satisfactorily, much plowing and seeding being done. Fruits are in general quite promising, although peach buds have been somewhat winter killed.—*J. Warren Smith.*

Oklahoma and Indian Territories.—The mean temperature was 51.5°, or 1.8° above normal; the highest was 86°, at Ardmore, Ind. T., on the 4th, and the lowest, 11° at Beaver, Okla., on the 6th, and at Kenton, Okla., on the 16th. The average precipitation was 4.02, or 1.81 above normal; the greatest monthly amount, 7.81, occurred at Tahlequah, Ind. T., and the least, 1.05, at Beaver, Okla.

The precipitation was decidedly above the average, and, in connection with the accompanying warmth, caused the crops in the ground to rapidly revive and improve in condition. Wheat, which was in very poor condition, regained its vigor and made rapid improvement, and by the close of the month was promising from half to an average yield; many fields of early-sown, soft wheat, however, were so thin that they were plowed up and placed in oats and corn; oats were sown and coming up to a good stand; rye, barley, and grasses were doing well; corn ground was prepared and some planting done, and some early planted coming up; cotton ground was being prepared and was in excellent condition; fruit trees were blooming, with a fine prospect; stock thin, but doing well, and in some counties is out on range.—*C. M. Strong.*

Oregon.—The mean temperature was 43.2°, or 0.5° below normal; the highest was 83°, at Prineville on the 28th, and the lowest, 3°, at Bend on the 27th. The average precipitation was 5.19, or 0.71 above normal; the greatest monthly amount, 19.01, occurred at Bay City, and the least, 0.05, at Umatilla.

The month of March was wet, cold, and deficient in sunshine, and consequently unfavorable for fall-sown grain and the advancement of farm work. On poorly-drained land in the Willamette Valley fall wheat turned yellow, and at the end of the month it was spotted and not as promising as it was a month ago. On the higher and better-drained land the plant was healthy and vigorous and had stooled nicely. In southern Oregon the wheat fields were generally in a promising condition, but in eastern Oregon fall wheat was not as far advanced as usual.—*Edward A. Beals.*

Pennsylvania.—The mean temperature was 41.3°, or 5.8° above normal; the highest was 78°, at Lycippus on the 13th, and the lowest, 2°, at California on the 6th. The average precipitation was 3.98, or 0.45 above normal; the greatest monthly amount, 7.50, occurred at Somerset, and the least, 0.77, at Erie.

Grain was well protected by snow and wintered in fairly good condition. Plowing, seeding, and gardening began during the latter part of the month. Fruit buds uninjured.—*T. F. Townsend.*

Porto Rico.—The mean temperature was 74.6°, or 0.7° below normal; the highest was 95°, at Cayey on the 1st, and the lowest, 51°, at Cayey and Barros on the 4th and at Adjuntas on the 31st. The average precipitation was 2.52, or 0.50 below normal; the greatest monthly amount, 7.69, occurred at Hacienda Perla, and the least, 0.07, at Ponce.

Weather all that could be desired for sugar making, which continued without interruption; grade of juice generally satisfactory and improving. Crops suffered for want of rain, especially in southern districts where not irrigated. Dry weather retarded spring planting. Tobacco revived by showers in early part of month and good grade of leaf being cut; sowing continued to end of month. Coffee trees flowered abundantly and first blossoms considered safely fixed; outlook excellent. Some corn, beans, frijoles, and rice planted. Pastures generally dry and cattle suffering in consequence.—*E. C. Thompson.*

South Carolina.—The mean temperature was 54.0°, or 0.5° below normal; the highest was 86°, at Gillisonville on the 19th, and the lowest, 19°, at Barksdale on the 4th, Greenville on the 6th, Health Springs on the 18th, and Walhalla on the 19th. The average precipitation was 4.08, or 0.32 above normal; the greatest monthly amount, 7.19, occurred at Trenton, and the least, 1.90, at Darlington.

The temperature conditions were variable, with frequent cool periods and freezing weather that retarded growth. The rainfall was evenly distributed, but so heavy over the western portions of the State as to prevent extensive preparation of lands for spring planting and but little corn was there planted. More favorable conditions prevailed over the eastern counties, where spring planting of corn, rice, truck, sorghum, and gardens was well advanced and some cotton planted. Tobacco plants in beds remained small but healthy.—*J. W. Bauer.*

South Dakota.—The mean temperature was 34.1°, or 7.0° above normal; the highest was 77°, at Fort Randall on the 9th, and the lowest, 20° below zero, at Ashcroft on the 16th. The average precipitation was 1.80, or 0.30 above normal; the greatest monthly amount, 5.53, occurred at Fort Meade, and the least, 0.43, at Canton.

An unusually severe and prolonged cold wave for March passed over the State from the 15th to 17th, with high northerly winds, and in northern sections a snowstorm, resulting in considerable loss of unsheltered range live stock in some localities. General rains the latter part of the month, and cold and windy weather earlier, considerably interrupted and delayed farming operations, but much preparatory field work was done, and in southeastern counties some spring wheat was sown. The rains left the soil in amply moist condition generally and some lowlands too wet. Fall sown rye generally came through the winter in good condition, though in some upland fields it was injured.—*S. W. Glenn.*

Tennessee.—The mean temperature was 50.0°, or 1.2° above normal; the highest was 85°, at Decatur on the 25th, and the lowest, 9°, at Silver Lake and Rugby on the 6th. The average precipitation was 7.14, or 1.25 above normal; the greatest monthly amount, 12.50, occurred at Lewisburg, and the least, 3.55, at Elizabethton.

Conditions were generally unfavorable for farm work and for the growth of vegetation, owing to the low temperatures. Early sown wheat was much improved by the end of the month, but late sown was still very poor. Some corn, early potatoes, and spring oats were seeded, and gardening was begun. Not much plowing was done. Clover and grasses were looking well. Heavy rains on the 28th wrought great damage in the middle section, washing away soil and fencing and flooding crops.—*H. C. Bate.*

Texas.—The mean temperature was 60.1°, or 1.5° above normal; the highest was 108°, at Fort Ringgold on the 14th, and the lowest, 17°, at Mount Blanco on the 5th. The average precipitation was 1.81, or 0.21 below normal; the greatest monthly amount, 8.81, occurred at Grapevine, while none fell at El Paso, Fort Brown, Fort McIntosh, Menardville, and Laureles Ranch.

The weather conditions were generally favorable over a large portion of the east and northeast sections of the State, along the gulf coast, and in localities in the south-central section and the Panhandle, and all crops throughout these districts made satisfactory progress. Elsewhere little or no rain fell, and a drought that has continued unbroken during the greater portion of the winter months still prevails over the southern, southwestern, and Rio Grande counties. Considerable cotton was planted, and where sufficient moisture was received the early planted crop was up and growing. The bulk of the corn crop was planted, and by the close of the month many fields were up and being worked. Sugar cane was up and the seeding of sorghum was in progress. Truck farms were in excellent condition. Where rain fell a marked improvement was noted in the condition of the grain crops. Prospects for fruit continue excellent. In the drought stricken districts the planting of cotton and corn has been greatly delayed, and the early planted has failed to germinate; pastures are bare and water is extremely scarce; and in some of the southwestern counties a veritable famine prevails.—*Edward H. Bowie.*

Utah.—The mean temperature was 34.9°, or 2.7° below normal; the highest was 73°, at St. George on the 17th, and the lowest, 9° below zero, at Soldier Summit on the 30th. The average precipitation was 1.28, or 0.05 above normal; the greatest monthly amount, 6.06, occurred at Ranch, and the least, trace, at Terrace.

Cold and stormy weather held back vegetation and interfered with farm work. The month closed with the season at least ten days later than usual. Fall grain continues in good condition. Fruit buds were swelling rapidly at the close of the month, but had not opened.—*L. H. Murdoch.*

Virginia.—The mean temperature was 47.2°, or 3.1° above normal; the highest was 81°, at Columbia on the 29th, and the lowest, 8°, at Burkes Garden on the 19th. The average precipitation was 2.97, or 0.86 below normal; the greatest monthly amount, 6.25, occurred at Bigstone Gap, and the least, 0.97, at Williamsburg.

Temperatures above the normal for the month combined with occasional warm rains were very helpful to fall sown crops. Winter wheat, oats, and clover are, however, still backward. Some spring plowing has been done, and the seeding of spring oats has begun. Fruit buds of the early blooming varieties of peaches began to swell about the 20th and were in full bloom by the 31st.—*Edward A. Evans.*

Washington.—The mean temperature was 41.7°, or about normal; the highest was 71°, at Hooper on the 31st, and the lowest, 13°, at Usk on the 17th. The average precipitation was 3.72, or 0.59 above normal; the greatest monthly amount, 17.28, occurred at Clearwater, and the least, 0.03, at Pasco.

Fore part of month warm, latter part cool, with frosts; spring backward, but, on that account, is thought favorable for fruit. Ground too wet for working in western section, but plowing and wheat seeding progressed steadily in eastern section. Condition of winter wheat improved; much had to be resown.—*G. N. Salisbury.*

West Virginia.—The mean temperature was 43.4°, or 1.1° above normal; the highest was 80°, at Logan on the 11th, and the lowest, 5° below zero, at Camden on the 6th. The average precipitation was 4.30, or 0.31 above normal; the greatest monthly amount, 6.29, occurred at Williamson, and the least, 3.00, at Central Station.

Practically no farm work done until the fourth week, which was mild and pleasant. Winter wheat, rye, and oats generally below average condition, with prospect for not more than half a crop; some wheat and fall-sown grass winter-killed; fruit buds swelling and prospects excellent, except for peaches.—*E. C. Vose.*

Wisconsin.—The mean temperature was 36.0°, or 8.2° above normal; the highest was 75°, at Knapp on the 26th, and the lowest, 10° below zero, at Hayward on the 17th and at Butternut on the 18th. The average precipitation was 1.33, or 0.60 below normal; the greatest monthly amount, 2.65, occurred at Green Bay, and the least, 0.20, at Antigo.

The month as a whole was remarkably warm, especially during the first and third decades. Considerable seeding was done during the latter part of the month, with the soil in very good condition. Winter grains are almost universally reported in good condition, but clover and meadows generally are only fair.—*W. M. Wilson.*

Wyoming.—The mean temperature was 30.7°, or 1.5° above normal; the highest was 85°, at Rock Springs on the 14th, and the lowest, 19° below zero, at Daniel on the 3d. The average precipitation was 0.99, or 0.33 below normal; the greatest monthly amount, 2.46, occurred at Fort Yellowstone, and the least, trace, at Lovell (Byron P. O.).

The month was quite favorable for stock, although some of the cold storms were trying on both sheep and cattle. The stock losses for the winter have been very light and stock is now in good condition over most sections of the State. Some plowing in Big Horn and the eastern counties and in a few of the earlier sections some seeding was done.—*W. S. Palmer.*

SPECIAL CONTRIBUTIONS.

RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau:

Scientific American. New York. Vol. 86.
Trowbridge, John. Lightning above and below Water. P. 239.
Scientific American Supplement. New York. Vol. 53.
—— The Inert Constituents of the Atmosphere. Pp. 21950–51.
Journal of the Franklin Institute. Philadelphia. Vol. 153.
—— Subterranean temperature. P. 284.
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STUDIES ON THE STATICS AND KINEMATICS OF THE ATMOSPHERE IN THE UNITED STATES.

By Prof. FRANK H. BIGELOW.

III.—THE OBSERVED CIRCULATION OF THE ATMOSPHERE IN THE HIGH AND LOW AREAS.

GENERAL DESCRIPTION OF THE VECTORS OBTAINED BY OBSERVATION.

In my original report on the cloud observations of 1896-97, it was necessary to present the data in such a form that other students could have the facts at first hand. As then pointed out there are several subareas in which only a few observations were located, and they are quite unevenly distributed about the central axis, so that the final vectors as computed do not have the well-balanced smoothness which it is desirable to obtain. The data was given in the form of tabulations and also of diagrams, since it is easier to secure from the latter a clear mental picture of the average configuration of the vectors of motion in all parts of the cyclones and anticyclones. Having done this at the outset I now proceed to draw up an average system of vectors by the process of graphic adjustment. There will still remain some uncertainty as to the finer details in certain areas where the motion is more complicated, but I am quite sure that the results presented in this paper give a very correct idea of the mean motions of the atmosphere over the United States and Canada. It would require a good deal more labor in observation and computation than was involved in a single year's campaign to bring the work to that degree of perfection which is desired by meteorologists; this work must undoubtedly be expended in the interest of science some time in the future. Especially for the higher strata of the high and low areas do we need more observations, because the powerful eastward drift quickly obscures the comparatively small gyratory components that penetrate up to the high levels. It should be remembered that the vectors in hand were procured by observing the motions of the air almost daily throughout the year, and consequently that all kinds of weather have entered our final results. If we want the characteristic circulation pertaining to well developed cyclonic and anticyclonic

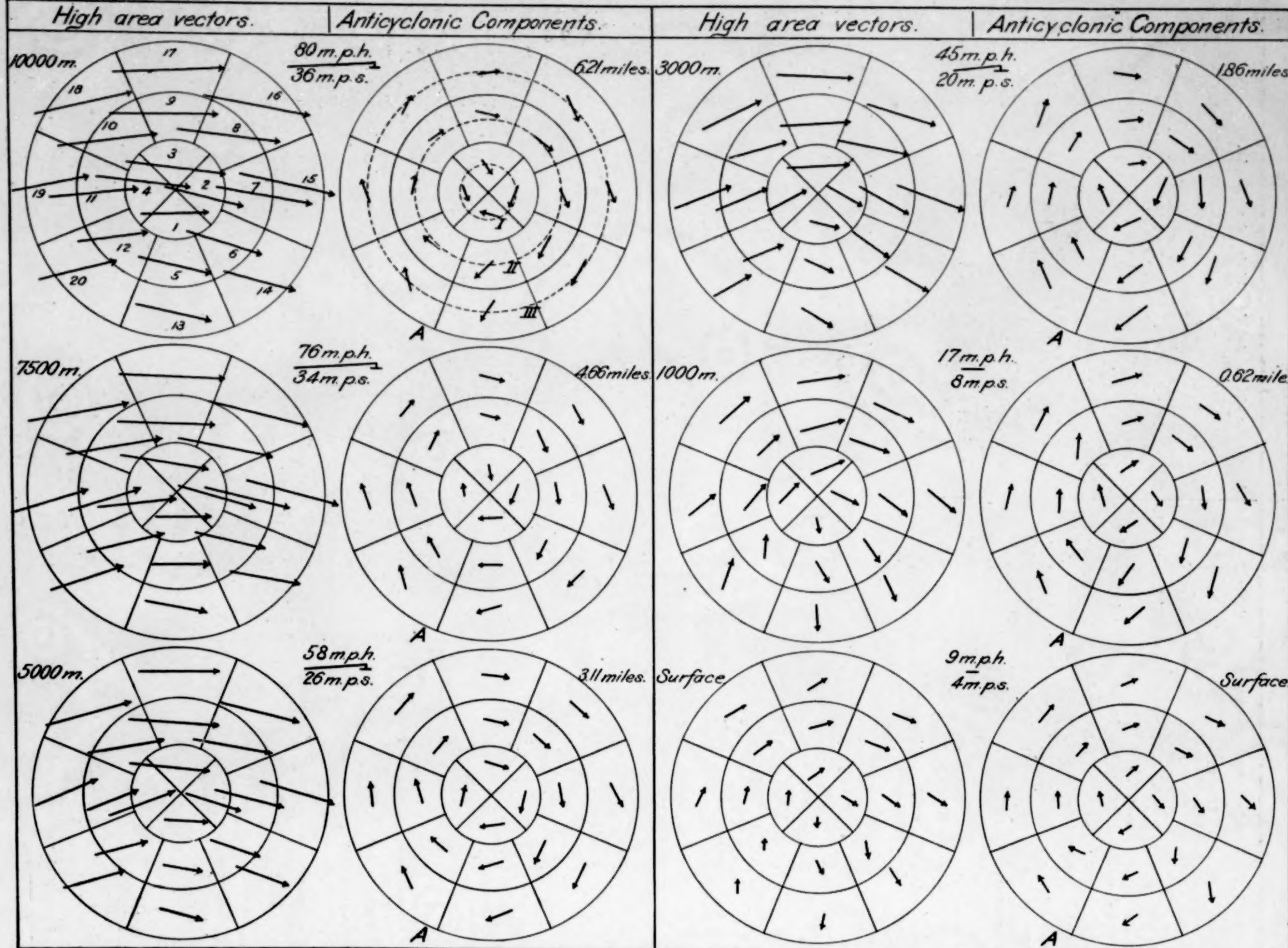

FIG. 6.—Adjusted mean vectors of direction and velocity of motion in high areas. 10,000 meters = 6.21 miles. Scale of distances, 1 cm. = 500 kilomters; velocities, 1 mm. = 2 meters per second. 1 meter per second = 2.24 miles per hour.

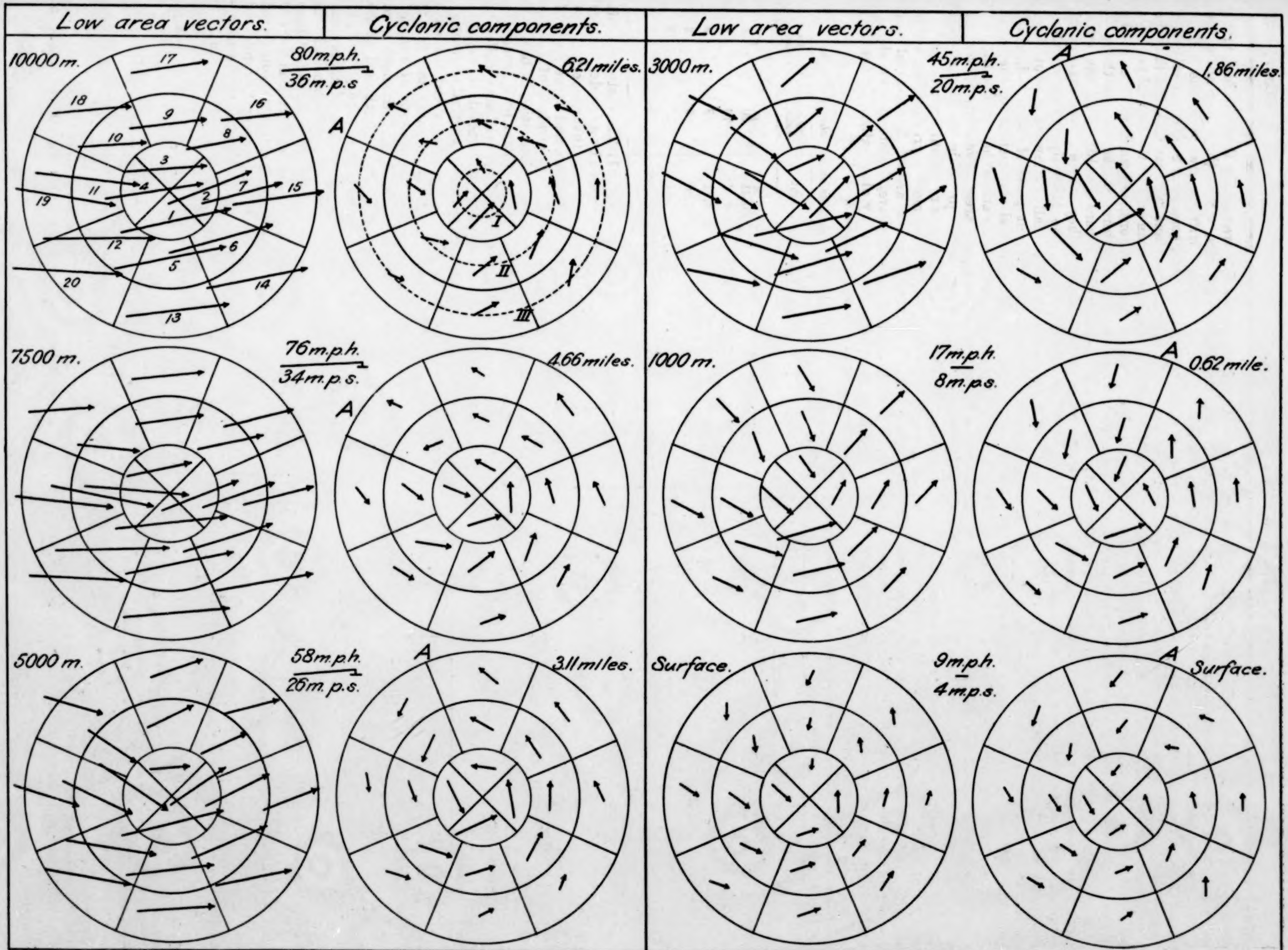

FIG. 7.—Adjusted mean vectors of direction and velocity of motion in low areas. 10,000 meters = 6.21 miles. Scale of distances, 1 cm. = 500 kilometers; velocities, 1 mm. = 2 meters per second. 1 meter per second = 2.24 miles per hour.

configurations, it can be found only by selecting the vectors on certain days when these types are strongly organized, and discussing them by themselves. Under the circumstances that pertained to the cloud year we were obliged to put every kind of observation together, without selection, and this necessarily produced many irregularities in the final scheme of vectors. I have now gone over the data again, and by studying the balance of the various parts of the system have brought out the revised scheme herewith presented. Its well-balanced symmetry speaks strongly for its average accuracy, and it will be possible to draw out of it many important conclusions of fundamental value for theoretical meteorology. We may remark that none of the principles enunciated in the original report have undergone modification by this present review.

By comparing the vectors of figs. 6 and 7 of this paper with Tables 34–47 and Charts 15 and 16 of the Cloud Report, one may readily examine all the changes that have been adopted, and may also discover how closely these charts represent the mean system indicated by the original observations. Instead of carrying the discussion through on the mean cloud levels where the observations were made, it is more convenient to select certain planes upon which the average vectors are established for further discussion.

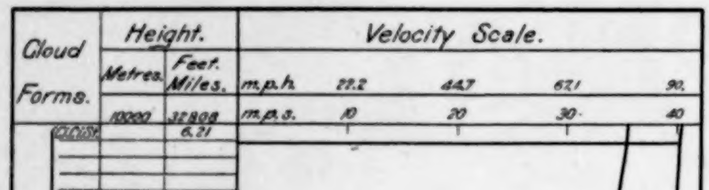

FIG. 8.—Total eastward velocities in high and low areas.

It is necessary first to establish the normal mean annual vectors representing the eastward drift to which the observed vectors are to be referred, in order to decompose them and obtain the anticyclonic and the cyclonic vectors by themselves. These normal vectors are given in Table 4, which is an extract from Table 33, III, International Cloud Report. The eastward velocities are also represented by fig. 8, total eastward velocities in high and low areas, which shows that the low areas drift eastward more rapidly than the high areas at all levels above the stratus, where they have about the same velocity, and that they drift northward in the United States, in the upper levels, at a somewhat higher velocity than in the low levels. It is important to bear in mind that the results of our observations pertain only to the central portions of the North American Continent, eastward of the Rocky Mountains, where the cyclonic storm tracks have on the average a northeastward direction toward the Gulf of St. Lawrence. On the Rocky Mountain slope they have a movement toward the south before recurving in the Mississippi Valley. Generally the eastward drift has a small northward or southward component varying in the different parts of the world, and it is not quite proper to draw general conclusions for the entire hemisphere from the motion of the atmosphere in one district. Furthermore, since the cyclonic areas have a special vortical progression of their own, it seems probable that the average velocities observed in the high areas represent the true motion of the total mass of circulating air more correctly than would the mean of the high and the low areas. The normal eastward and northward components have, therefore, been chosen a little in excess of those given by observation for the high areas, and they are given in Table 8.

TABLE 8.—*Normal component velocities on six selected planes.*

Height.	Eastward velocity.	Northward velocity.	Height.	Eastward velocity.	Northward velocity.
Meters.	*m. p. s.*	*m. p. s.*	*Miles.*	*m. p. h.*	*m. p. h.*
10,000	36	— 2	6.21	80	— 4
7,500	34	— 2	4.66	76	— 4
5,000	26	— 1.5	3.11	58	— 3
3,000	20	— 1	1.86	45	— 2
1,000	8	— 1	0.62	17	— 2
Surface	4	— 0.5	Surface	9	— 1

Two points may be noted in passing: (1) The eastward drift seems to be stratified into a series of steps by a decided change of the eastward velocity, and it appears that some form of stratus cloud is to be found at the bottom, and some form of cumulus cloud at the top, of each distinct stratum of flowing air. This indicates that at the surface of discontinuity between moving strata, the stratus type of cloud forms by a process of cooling through mixture from adjacent layers of air at different temperatures, which is in accord with general theory. It also shows that the cumulus clouds form by vertical convection and dynamic cooling within a stratum having about the same uniform velocity of motion throughout its mass and this is also theoretically correct. (2) The components of average total motion do not show that the atmosphere drifts northward in the higher levels and at the surface, and southward in the lower middle levels, somewhat elevated from the ground, as was claimed should be the case by Professor Ferrel in his canal theory of the general circulation of the atmosphere. I will return to this topic and consider it at length, but the fact here indicated is that the observations do not sustain that part of the general canal theory. It is becoming clearly demonstrated to students that the circulation of the air is a more complicated problem than the early meteorologists assumed, and in consequence it will be necessary to study in detail the stream lines over the several continents and oceans, find out their local characteristics, and after that try to combine them in a large comprehensive scheme.

DESCRIPTION OF THE CIRCULATION OVER HIGH AND LOW AREAS.

Figs. 6 and 7 represent the adjusted mean vectors of direction and velocity of motion in high and low areas, as derived from the Weather Bureau observations of 1896–97. They are based upon about 6,000 theodolite observations made at

Washington, D. C., and about 25,000 nephoscope observations made at 15 stations distributed quite uniformly over the territory east of the Rocky Mountains. They give only a mean or average scheme of the circulation and are necessarily somewhat idealized, as regards the movements of the air in individual configurations, since they include all the anticyclones and cyclones of the cloud year, many of which were only imperfectly developed, and could not have agreed with the best types that might have been selected. In order that no false impressions should remain with students concerning the actual circulation of the atmosphere, because of this construction of a well-balanced type, I compiled for the International Cloud Report a series of composite charts, Nos. 20 to 35, inclusive, which show the actual stream lines in high and low areas over the several areas of the United States, both for summer and winter. These charts are not only interesting, but they are very valuable, because they give the normal flow of the air when the anticyclonic and cyclonic centers are located in different parts of the country. They ought to be studied carefully by every forecaster, and the general knowledge given by the charts should be kept firmly in mind when considering the meaning of the individual daily weather maps, as they will guide the judgment to safer conclusions than would be possible without them. For the student of theoretical meteorology they are indispensable, because they correct the impressions which may be given by a contemplation of the figs. 6 and 7, or by reflecting upon the analytical formulæ.

DISCUSSION OF THE VECTORS IN HIGH AREAS.

The area about the center of circulation was subdivided into twenty small parts, numbered as already described in a previous paper; the upper left-hand plans of figs. 6 and 7 show them again for convenience of reference. Through the center of each of the three concentric groups a circle is drawn in dotted lines, and these are marked I, II, III, their distance from the center being 250, 750, 1,250 kilometers, respectively. The adopted heights of the planes of motion in meters and miles are written on each level, also the normal velocity vector in meters per second (m. p. s.), and miles per hour (m. p. h.). The scale of distances is 1 cm. = 500 kilometers, and the scale of velocities is 1 mm. = 2 meters per second; the latter can be reduced to miles per hour by multiplying with the factor 2.24. The left-hand plans contain the total vector as observed in the atmosphere; the right-hand plans give the component vector, which, combined with the normal vector, produces the observed vector, using the rule of the parallelogram of vectors. Each vector has been carefully constructed and deserves considerable confidence. The smoothly balanced configuration in each level and the gradual change which occurs in passing from one level to another show that this represents a natural and easy form of flow for the atmosphere, so that the motion will occur without sharp changes. The figures speak plainly for themselves, and only a few words are required regarding the distinguishing features. In the high areas the total flow diminishes in strength from 10,000 meters to the surface; it has a slight curvature northward over the center in the highest level, but this concavity of the curves gradually increases till in the lower levels and at the surface the sinuous lines are converted into anticyclonic gyrations. The vectors north of the center are longer than those south of it from the top to the bottom. There is, however, a strong eastward drift in all levels, inward on the west side and outward on the east side, which is never overcome.

Passing now to the anticyclonic component vectors, it is noted that there is a remarkable symmetry in the configuration from the highest level to the lowest, taken as a whole. There are, however, two special features to be observed: (1) In the central areas, I, the flow is inward on the highest level, more from the north, however, than from the south; it is tangential on the middle level; and it is outward in the lowest level. This indicates a type of true vortex motion, which prevails at the center of anticyclones, and by it the air is drawn in at the top and discharged at the bottom of the vortex tube. (2) On the middle areas, II, the flow is nearly tangential throughout the entire series of strata, but on the outer areas, III, the vectors are pointed slightly outward from the top to the bottom, though more strongly on the east side than on the west side. There is, furthermore, the special feature that at the south or southwest side of the anticyclonic area, near the place marked *A*, a distinct discontinuity occurs in the vectors, by which on the west side an inflow from the south takes place, and on the east side an outflow from the north is indicated. I interpret these two facts together to mean that in the southeast quadrant there is a tendency for a heavy stream of the general circulation from the northwest to divide, so that a large portion moves to the south side of the adjacent cyclonic area and a small portion curls westward about the center of the high area. Also, on the west side of the high area a stream from the south divides, part flowing over the north of the high area and another part curling about the north side of the center of the adjacent low area. Fig. 9, Curling of the northward and southward streams about the centers of high and low areas, gives an idea of this process, especially in the strato-cumulus level, or at about 3,000 meters elevation. The heavy broken line represents the resulting sinuous eastward flow at that level. In the flow of fluids a wave motion, when the velocity exceeds a given amount, collapses and reappears in the form of whirls of discontinuous surfaces along the sides. Something of this sort is apparently operating in this connection.

We observe that in the 3,000-meter level the anticyclonic vectors are stronger than in the levels above or below, the diminution toward the surface being greater than toward the higher levels. The superposition of the component gyration upon the eastward drift is distinct and even vigorous at 10,000 meters, and hence it is inferred that the disturbance of the atmosphere in high areas extends to at least 6 or 8 miles, though only as a small deflection of the eastward drift in the upper strata.

DISCUSSION OF VECTORS IN LOW AREAS.

The vectors in the low areas should in general be a little longer than those in the high areas. In nature the highs cover a larger territory than do the lows, but as the amount of air which streams through each of them is probably about the same, it would require a greater velocity in the lows to produce an equal discharge through them. The vectors flow southward relatively to the center, and they are larger on the southern side than on the northern. The connection of the streams between the high and low areas is shown by the smooth flow of the two sets of vectors on their eastern and western sides, respectively. The stream lines are convex upward, and the curvature increases from the 10,000-meter level to the surface. In the 1,000-meter level the gyratory movement nearly supersedes the sinuous or wave-like flow, but the vectors on the north side are not entirely reversed to the westward.

The cyclonic components are very symmetrically formed throughout the entire stratum of air that has been examined. They have the following characteristic, namely, that from the surface to the 10,000-meter level the vectors have an inflow toward the center, except in a few subareas marked with the letter A. It is noted that from the 10,000-meter level to the 1,000-meter level, near the place A, the vectors are almost exactly opposed to each other in direction, those on the east side flowing outward and those on the west side flowing inward. This divergence of direction indicates that a stream flows from the north to the south on the west of the low area, and that an independent stream flows northward on the east side of the low area, something in the manner suggested on fig. 9. The

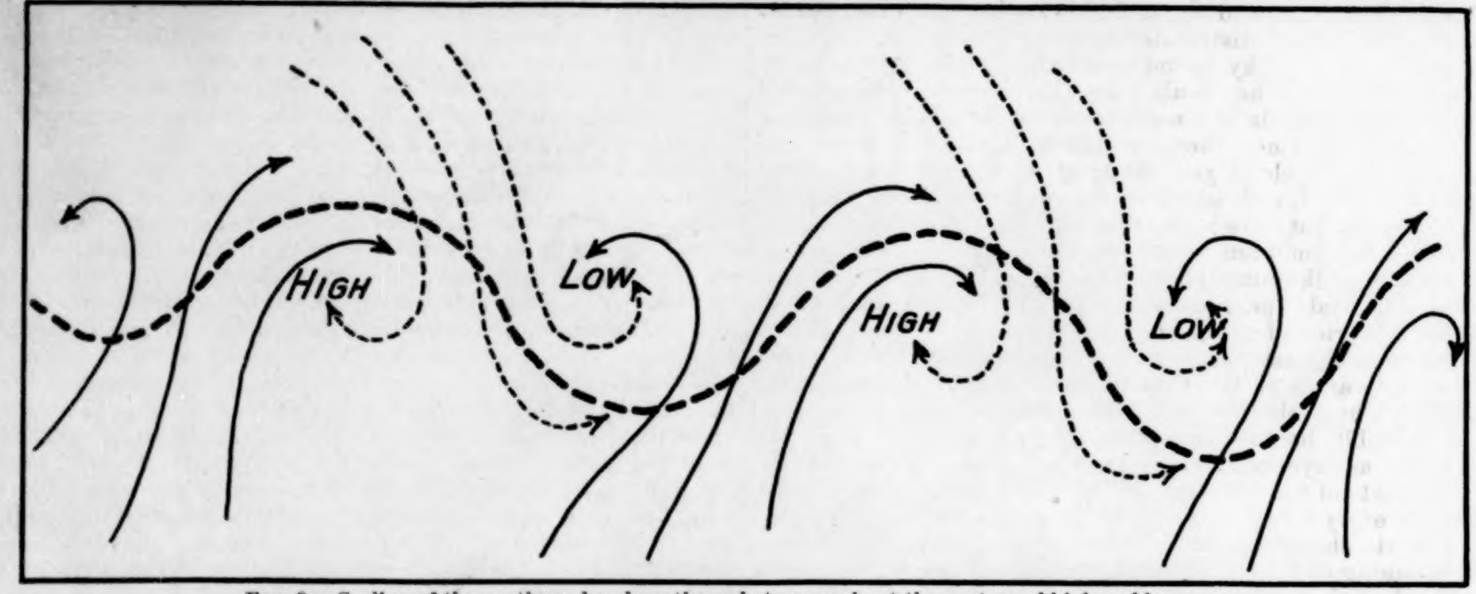

FIG. 9.—Curling of the northward and southward streams about the centers of high and low areas.

separate streams from the north and from the south coalesce on the south side of the center of the low area, as they do on the north side of the high area, but the two streams have an origin *outside* the areas of high and low pressure, respectively. Furthermore, it is noted that while in the high area the position of the point A is nearly stationary in all the strata mapped out, on the contrary it rotates nearly 90° from the east of north at the surface to the north of west in the highest stratum. The stream of warm air from the south curls around toward the west as it ascends from the surface to the upper levels, making a quarter of a helical revolution in an ascending spiral. The length of the vectors is greatest in the 3,000-meter level, 2 miles above the ground, and the vectors become gradually shorter upward and downward, diminishing more rapidly toward the surface. This agrees with the system of vectors in high areas, and shows that the influence of the cyclone extends above the 10,000-meter level, where it still deflects considerably the eastward drift, though it is most vigorous in the 3,000-meter level. The length of the vectors increases gradually from the III-areas to the I-areas, and averages about twice as long in the latter as in the former. In the anticyclonic components the III-vectors are even longer than the I-vectors, and they do not have any agreement with the simple vortex law $\varpi\,\omega =$ constant, where ϖ is the radial distance from the axis of rotation, and ω the angular velocity.

In the cyclonic components the I-vectors are longer than the III-vectors, but they fall short of exact conformity with the pure vortex theory. The entire flow suggests, therefore, the conflict of two counterflowing, horizontal streams which tend to produce vertical rotation, but in fact fail to reach this ideal, except possibly in highly developed cases of severe storms. There is no evidence that these motions are primarily

TABLE 9.—*Rectangular and cylindrical coordinates in high areas.*

Direction from center.	Area number.	10,000 meters.				7,500 meters.				Distance from center.
		u_1	v_1	u_2	v_2	u_1	v_1	u_2	v_2	
S	1	−2	+29	−2	−6	+2	+24	+2	−10	I. 250 km.
E	2	+6	+31	−4	−6	+8	+30	−4	−8	
N	3	+6	+40	−6	−5	+6	+36	−6	−2	
W	4	+4	+39	−3	+5	−4	+32	+2	−4	
S	5	+8	+28	+8	−8	0	+24	0	−10	II. 750 km.
SE	6	+10	+30	+2	−9	+8	+30	+3	−9	
E	7	+7	+40	+4	−7	+8	+36	+2	−8	
NE	8	+6	+43	+2	−7	+8	+38	−4	−8	
N	9	+2	+44	+2	−8	+4	+40	−4	−6	
NW	10	−4	+40	−2	−6	−8	+38	+4	−8	
W	11	−4	+36	−1	−4	−10	+30	+4	−10	
SW	12	−5	+28	0	−7	−8	+30	−4	−8	
S	13	+8	+30	+8	−6	+4	+24	+4	−10	III. 1,250 km.
SE	14	+9	+28	+2	−9	+6	+28	0	−9	
E	15	+9	+40	+4	−9	+10	+38	+4	−10	
NE	16	+10	+42	−4	−10	+9	+40	−4	−8	
N	17	−2	+44	+2	−8	+3	+42	−3	−8	
NW	18	−8	+40	+4	−8	−6	+40	+1	−8	
W	19	−8	+32	+4	−8	−9	+30	+4	−9	
SW	20	−8	+32	−4	−6	−8	+28	−6	−8	

TABLE 10.—*Rectangular and cylindrical coordinates in low areas.*

Direction from center.	Area number.	10,000 meters.				7,500 meters.				Distance from center.
		u_1	v_1	u_2	v_2	u_1	v_1	u_2	v_2	
S	1	−10	+46	−10	+10	−6	+46	−6	+12	I. 250 km.
E	2	−12	+34	−2	+12	−12	+32	−2	+12	
N	3	−4	+32	+4	+4	−6	+26	+6	+8	
W	4	−6	+40	−6	−4	+4	+44	−10	+4	
S	5	−8	+44	−8	+8	−10	+44	−10	+10	II. 750 km.
SE	6	−12	+42	−5	+14	−12	+34	−6	+10	
E	7	−10	+32	−4	+10	−10	+30	−4	+10	
NE	8	−4	+24	−4	+12	−6	+26	−4	+9	
N	9	−6	+32	+4	+6	−4	+28	+4	+6	
NW	10	−3	+30	+6	+3	+4	+26	+4	+8	
W	11	+6	+44	−6	+8	+8	+42	−8	+8	
SW	12	+2	+46	−6	+8	0	+46	−7	+10	
S	13	−4	+44	−4	+8	−4	+42	−4	+8	III. 1,250 km.
SE	14	−8	+40	−4	+8	−8	+38	−4	+8	
E	15	−6	+36	0	+6	−8	+30	−4	+8	
NE	16	−4	+28	−4	+8	−8	+28	+2	+10	
N	17	−4	+30	+4	+6	−4	+30	+4	+4	
NW	18	−4	+30	+6	+4	−2	+28	+6	+2	
W	19	+6	+42	−6	+6	+6	+40	−6	+6	
SW	20	+4	+42	−4	+6	+4	+40	−2	+7	

TABLE 9.—*Rectangular and cylindrical coordinates in high areas*—Cont'd.

Direction from center.	Area number.	5,000 meters.				3,000 meters.				Distance from center.
		u_1	v_1	u_2	v_2	u_1	v_1	u_2	v_2	
S	1	+ 2	+18	+ 2	− 8	+ 4	+12	+ 4	− 8	I. 250 km.
E	2	+ 8	+22	− 2	− 8	+ 8	+16	− 4	− 8	
N	3	+ 4	+34	− 4	− 8	− 2	+26	+ 2	− 6	
W	4	− 8	+28	− 2	− 8	− 8	+16	+ 4	− 8	
S	5	+ 4	+16	+ 4	−10	+ 6	+14	+ 6	− 6	II. 750 km.
SE	6	+ 8	+20	+ 4	− 8	+12	+14	+ 4	−12	
E	7	+ 8	+28	+ 2	− 8	+10	+20	0	−10	
NE	8	+ 6	+32	0	− 8	+ 6	+28	+ 2	−10	
N	9	+ 3	+34	− 3	− 8	− 2	+28	+ 2	− 8	
NW	10	− 6	+30	+ 1	− 7	− 8	+24	+ 2	−10	
W	11	− 8	+24	+ 2	− 8	− 8	+24	− 4	− 8	
SW	12	− 6	+20	0	− 8	− 6	+14	− 4	− 8	
S	13	+ 4	+16	+ 4	−10	+ 8	+10	+ 8	−10	III. 1,250 km.
SE	14	+ 8	+22	+ 4	− 8	+10	+16	+ 5	−11	
E	15	+ 8	+30	+ 4	− 8	+10	+26	+ 6	−10	
NE	16	+ 7	+32	0	−10	+10	+28	− 2	−12	
N	17	0	+36	0	−10	+ 2	+30	− 2	−10	
NW	18	− 9	+32	+ 1	−11	−12	+24	+ 4	−12	
W	19	−10	+24	+ 2	−10	−10	+24	− 4	−10	
SW	20	− 8	+22	− 4	− 8	− 8	+14	− 4	−10	

Direction from center.	Area number.	1,000 meters.				Surface.				Distance from center.
		u_1	v_1	u_2	v_2	u_1	v_1	u_2	v_2	
S	1	+ 4	+ 2	+ 4	− 6	+ 3	0	+ 3	− 4	I. 250 km.
E	2	+ 6	+12	+ 4	− 6	+ 3	+ 7	+ 3	− 3	
N	3	− 6	+14	+ 6	− 6	− 4	+ 7	+ 4	− 3	
W	4	− 8	+ 6	+ 2	− 8	− 5	+ 2	+ 2	− 5	
S	5	+ 8	+ 4	+ 8	− 4	+ 3	+ 1	+ 3	− 3	II. 750 km.
SE	6	+10	+ 6	+ 6	− 8	+ 4	+ 2	+ 4	− 4	
E	7	+ 8	+10	+ 2	− 8	+ 6	+ 8	+ 4	− 6	
NE	8	+ 6	+16	+ 6	− 8	+ 4	+10	+ 2	− 7	
N	9	− 4	+16	+ 4	− 8	− 3	+10	+ 3	− 6	
NW	10	− 8	+10	+ 1	− 9	− 5	+ 8	0	− 6	
W	11	−10	+ 8	0	−10	− 6	+ 2	+ 2	− 6	
SW	12	− 8	+ 2	− 2	−10	− 3	0	+ 2	− 5	
S	13	+ 8	0	+ 8	− 8	+ 4	− 1	+ 4	− 5	III. 1,250 km.
SE	14	+10	+ 4	+ 6	− 9	+ 7	+ 5	+ 6	− 4	
E	15	+ 8	+14	+ 6	− 8	+ 6	+ 9	+ 5	− 6	
NE	16	+ 8	+16	+ 2	−11	+ 4	+10	+ 2	− 7	
N	17	− 4	+18	+ 4	−10	− 4	+ 8	+ 4	− 4	
NW	18	−10	+12	+ 4	−10	− 6	+ 8	+ 1	− 7	
W	19	−10	+10	− 2	−10	− 7	+ 4	0	− 7	
SW	20	−10	+ 4	− 4	−10	− 5	− 1	− 2	− 5	

+ u_1 = southward. + u_2 = radial outward.
+ v_1 = eastward. + v_2 = tangential counter clockwise.

due to vertical convective currents developed through the local heating or cooling of restricted areas near the center of the cyclonic and anticyclonic areas, respectively. It is evidently desirable to avoid extreme statements in this connection, because a study of the motions of the atmosphere shows that nearly every possible type of motion from the counterflow of opposing horizontal streams to the pure vortex due to an ascending helix may occur, and yet the present compilation indicates that the former is the average type to which the stream lines conform in the extra-tropical circulation of the United States.

TABLE 10.—*Rectangular and cylindrical coordinates in low arean*—Cont'd.

Direction from center.	Area number.	5,000 meters.				3,000 meters.				Distance from center.
		u_1	v_1	u_2	v_2	u_1	v_1	u_2	v_2	
S	1	−10	+42	−10	+16	−10	+40	−10	+20	I. 250 km.
E	2	−16	+22	− 4	+16	−18	+16	− 4	+18	
N	3	− 2	+16	+ 2	+10	− 8	+12	+ 8	+ 6	
W	4	+14	+28	− 6	+14	+16	+28	− 8	+16	
S	5	− 4	+36	− 4	+10	−10	+32	−10	+12	II. 750 km.
SE	6	−14	+32	− 5	+14	−12	+26	− 6	+12	
E	7	−12	+24	− 2	+12	−14	+24	− 4	+14	
NE	8	−10	+20	+ 4	+12	−12	+12	+ 4	+14	
N	9	−10	+18	+ 6	+10	−12	+14	+ 6	+12	
NW	10	+12	+20	− 6	+12	+12	+18	− 7	+10	
W	11	+12	+30	− 4	+12	+16	+22	− 2	+16	
SW	12	+ 4	+38	− 4	+12	+12	+32	0	+18	
S	13	− 4	+32	− 4	+ 6	− 6	+28	− 6	+ 8	III. 1,250 km.
SE	14	− 6	+30	− 4	+ 6	− 8	+26	− 2	+10	
E	15	− 8	+22	− 4	+ 8	−10	+18	− 2	+10	
NE	16	− 6	+22	+ 2	+ 7	−10	+14	+ 4	+10	
N	17	− 8	+20	+ 6	+ 8	−12	+14	+12	+ 6	
NW	18	+ 6	+22	− 2	+ 7	+10	+18	− 6	+ 8	
W	19	+ 8	+28	− 2	+ 8	+12	+24	− 4	+12	
SW	20	+ 4	+34	− 4	+ 8	+ 4	+28	− 4	+ 8	

Direction from center.	Area number.	1,000 meters.				Surface.				Distance from center.
		u_1	v_1	u_2	v_2	u_1	v_1	u_2	v_2	
S	1	− 6	+24	− 6	+16	− 4	+10	− 4	+ 6	I. 270 km.
E	2	− 8	+ 4	− 4	+ 8	− 6	0	− 4	+ 6	
N	3	+10	+ 4	−10	+ 4	+ 4	− 2	− 4	+ 6	
W	4	+10	+12	− 4	+10	+ 8	+ 8	− 4	+ 8	
S	5	− 4	+20	− 4	+12	− 4	+10	− 4	+ 5	II. 750 km.
SE	6	−10	+12	− 4	+10	− 6	+ 6	− 2	+ 6	
E	7	−10	+ 6	− 2	+10	− 6	+ 2	− 2	+ 6	
NE	8	−10	+ 8	+ 8	+ 6	− 4	− 2	− 2	+ 4	
N	9	+10	+ 4	−10	+ 4	+ 4	− 2	− 6	+ 4	
NW	10	+12	+ 4	− 6	+10	+ 6	+ 2	− 4	+ 5	
W	11	+ 8	+14	− 6	+ 8	+ 6	+ 8	− 4	+ 6	
SW	12	+ 8	+20	− 4	+14	+ 4	+10	− 2	+ 8	
S	13	− 4	+18	− 4	+10	− 4	+ 8	− 4	+ 4	III. 1,250 km.
SE	14	−10	+10	− 2	+10	− 6	+ 4	− 4	+ 4	
E	15	− 8	+ 8	0	+ 8	− 6	+ 4	0	+ 6	
NE	16	− 8	+10	+ 8	+ 4	− 4	− 2	− 2	+ 4	
N	17	+10	+ 6	−10	+ 2	+ 4	− 2	− 6	+ 4	
NW	18	+10	+ 8	− 9	+ 4	+ 6	0	− 4	+ 6	
W	19	+ 8	+14	− 6	+ 8	+ 6	+ 8	− 4	+ 6	
SW	20	+ 6	+14	0	+ 8	+ 3	+ 8	− 2	+ 5	

+ u_1 = southward. + u_2 = radial outward.
+ v_1 = eastward. + v_2 = tangential counter clockwise.

THE NUMERICAL VALUES OF THE VECTORS.

In order to bring out these facts a little more clearly, the vectors of fig. 6 have been translated into the numerical values of Table 9, Rectangular and cylindrical coordinates in high areas; and those of fig. 7 into the numbers of Table 10, Rectangular and cylindrical coordinates into low areas. These tables need no further explanation in this connection, after what has been already stated.

Table 11, Mean components on the I, II, III circles in meters

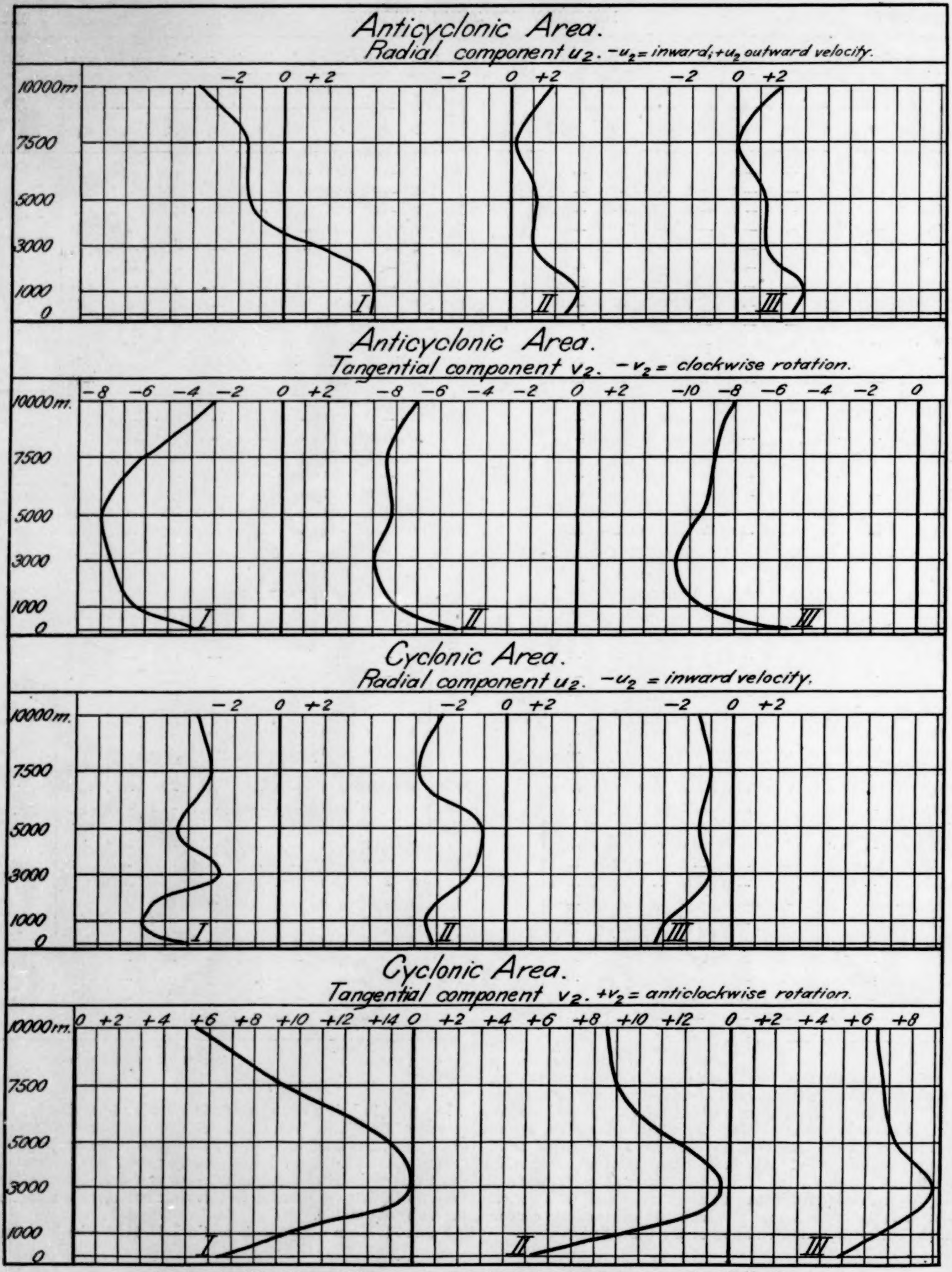

FIG. 10.—Radial and tangential components in anticyclonic and cyclonic areas. From Table 11.

per second and in miles per hour, is derived from the anticyclonic components of Table 9, and the cyclonic components of Table 10, by taking the arithmetical mean of the I-areas (1–4), the II-areas (5–12), and the III-areas (13–20). These means give the average value of the motion, though we, of course, depart from the perfectly natural condition by the summation. Thus in the anticyclonic areas for the radial component u_2 there is an inflow at the top of I-areas, and an outflow at the bottom; and a gentle outflow in the II-areas and III-areas from the top to the bottom. Also compare fig. 10, where the results of Table 11 are plotted. The tangential component v_2 is stronger throughout the middle strata than in those which are higher or lower, but it is much more vigorous in the III-areas than in the I-areas especially at the 3,000-meter level. In the cyclonic areas the radial component u_2 increases generally from the III-area to the I-area. There is a little irregularity in the changes of this component probably due to imperfections in my vector system. The tangential component v_2 increases rapidly from the III-areas to the I-areas, and remarkably so at the 3,000-meter level.

TABLE 11.—*Mean components on I, II, III circles.*

ANTICYCLONIC COMPONENTS.

Distance from center.	I. 250 kilometers.		II. 750 kilometers.		III. 1,250 kilometers.	
Meters per second.	u_2	v_2	u_2	v_2	u_2	v_2
$H=$10,000	− 3.8	− 3.0	+ 1.9	− 7.0	+ 2.0	− 8.0
7,500	− 1.5	− 6.0	+ 0.1	− 8.4	0.0	− 8.8
5,000	− 1.5	− 8.0	+ 1.3	− 8.1	+ 1.4	− 9.4
3,000	+ 1.5	− 7.5	+ 1.0	− 9.0	+ 1.4	−10.6
1,000	+ 4.0	− 6.5	+ 3.1	− 8.1	+ 3.0	− 9.5
0	+ 3.0	− 3.8	+ 2.5	− 5.4	+ 2.5	− 5.6

CYCLONIC COMPONENTS.

$H=$10,000	− 3.5	+ 5.5	− 2.9	+ 8.6	− 1.5	+ 6.5
7,500	− 3.0	+ 9.0	− 3.9	+ 8.9	− 1.0	+ 6.6
5,000	− 4.5	+14.0	− 1.9	+11.8	− 1.5	+ 7.3
3,000	− 3.5	+15.0	− 2.4	+13.5	− 1.0	+ 9.0
1,000	− 6.0	+ 9.5	− 3.5	+ 9.3	− 2.9	+ 6.8
0	− 4.0	+ 6.5	− 3.3	+ 5.5	− 3.3	+ 4.9

ANTICYCLONIC COMPONENTS.

Distance from center.	I. 155 miles.		II. 466 miles.		III. 777 miles.	
Miles per hour.	u_2	v_2	u_2	v_2	u_2	v_2
$H=$10,000	− 8.5	− 8.7	+ 4.3	−15.7	+ 4.5	−17.9
7,500	− 3.4	−13.4	+ 0.2	−18.8	0.0	−19.7
5,000	− 3.4	−17.9	+ 2.9	−18.1	+ 3.1	−21.0
3,000	+ 3.4	−16.8	+ 2.2	−20.1	+ 3.1	−23.7
1,000	+ 8.9	−14.5	+ 6.9	−18.1	+ 6.7	−21.3
0	+ 6.7	− 8.5	+ 5.6	−12.1	+ 5.6	−12.5

CYCLONIC COMPONENTS.

$H=$10,000	− 7.8	+12.3	− 6.5	+19.2	− 3.4	+14.5
7,500	− 6.7	+20.1	− 8.7	+19.9	− 2.2	+14.8
5,000	−10.1	+31.3	− 4.3	+26.4	− 3.4	+16.3
3,000	− 7.8	+33.6	− 5.4	+30.2	− 2.2	+20.1
1,000	−13.4	+32.4	− 7.8	+20.8	− 6.5	+15.2
0	− 8.9	+14.5	− 7.4	+12.3	− 7.4	+11.0

It has been taught in the common expositions of the canal theory of the general circulation that there exists in middle latitudes a strong northward component in the upper strata, a strong southward component in the surface and lower strata, and a powerful eastward component in all strata, increasing from the ground upward. It can be seen by inspecting figs. 6 and 7 that while there is everywhere a general eastward drift, there are certain subareas over which especially a northward component prevails, and others over which there is a southward component. In order to find the maximum meridional components it is expedient to select the following areas for the northward component: Low (16, 8, 2, 7, 15, 6, 14) and High (18, 10, 11, 19, 12, 20), and for the southward component High (16, 8, 2, 7, 15, 6, 14) and Low (18, 10, 4, 11, 19, 12, 20). The values of u_1, v_1 are taken for these areas from Tables 9 and 10, and the mean of them is given in Table 12, Northward and southward velocities in selected areas. It can be seen at once that the general canal theory is by no means supported by the observations. The fact seems to be that between the high and low centers, west of the high and east of the low, there is a northward current in all levels, strongest at about the 3,000-meter level, while east of the high and west of the low there is a southward current also strongest in the same level. The interchange of air between the pole and the Tropics appears, therefore, to be brought about by alternate currents in middle latitudes flowing past each other on the same levels, and not over each other at entirely different levels, as the canal theory requires. The thermal equilibrium of the air is, therefore, restored through the anticyclonic and cyclonic mechanism, and not by the overflowing currents from the Tropics to the poles and underflowing currents from the poles to the Tropics, as commonly taught. This profoundly modifies the canal theory of the general circulation of the atmosphere and introduces us to a new point of view. The discussion of the theories of the circulation of the air as explained by Ferrel, Oberbeck, and other meteorologists must be taken up next in order, and their views contrasted with the results of our observations.

TABLE 12.—*Northward and southward velocities in selected areas.*

Height of the stratum.	Northward. L. 16, 8, 2, 7, 15, 6, 14. H. 18, 10, 4, 11, 19, 12, 20.		Southward. H. 16, 8, 2, 7, 15, 6, 14. L. 18, 10, 4, 11, 19, 12, 20.	
	u_1	v_1	u_1	v_1
10,000	− 6.4	+34.5	+ 4.4	+37.7
7,500	− 8.4	+31.9	+ 5.8	+36.2
5,000	− 9.1	+25.2	+ 8.1	+27.6
3,000	−10.3	+19.7	+10.6	+22.7
1,000	− 9.2	+ 7.9	+ 8.4	+11.7
Surface	− 5.2	+ 2.6	+ 5.3	+ 6.9

Compare Table 124, International Cloud Report, p. 606.

FOG AND FROST FORMATION.

By DAVID CUTHBERTSON, Local Forecast Official.

An unusually dense fog, such as had not been observed for many years, occurred at Buffalo, N. Y., during the night of February 15 to 16, 1902. It was so remarkable for its great density and for the beautiful frostwork which formed on all sides of trees and other objects that it was a very common topic of conversation for days, and the local Weather Bureau

office was called upon, editorially, for explanation of the phenomenon.

South to southwest of Buffalo is Lake Erie, while the Niagara River runs along the entire west side of the city. Lake Erie, for a distance of about two miles from the source of Niagara River, and the river itself, were free from ice. The temperature of the water in the river was 34° F. and the current had a velocity of about 8 miles per hour.

The conditions of the meteorological elements concerned in the phenomenon, as observed at the Weather Bureau station on the night in question, are shown in the following table:

	P. M., February 15.					A. M., February 16.									
	8.	9.	10.	11.	12.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Wind direction	w.	w.	se.	s.	s.	s.	sw.	sw.	sw.	sw.	sw.	sw.	sw.	sw.	sw.
Wind movement	2	2	1	3	1	3	3	2	3	3	3	3	4.	3	5
Air temperature	20	19	17	16	15	14	13	12	13	12	11	10	8	8	11
Relative humidity, per cent	73	....	....	....	....	....	....	....	....	....	....	....	91	....	....
Dew-point, degrees	13	....	....	....	....	....	....	....	....	....	....	....	6	....	....

Dry and wet bulb thermometer readings taken over the water would have been interesting, but it is clear from the data at hand that, since the water of both lake and river was 14° or more warmer than the air, heat radiating from the water warmed the quiet, superincumbent air and greatly increased its capacity for water vapor. At the same time evaporation from the water surface nearly saturated this quiet, warm air; convectional currents mixed it with the colder layers above, thereby cooling it below its dew-point and condensing much of its vapor into fog particles. After the air had been well saturated with aqueous vapor, the wind slowly carried it over the city, where still further cooling caused more condensation and produced denser fog. The steady and rather rapid fall in temperature from 20° at 8 p. m. to 8° at 8 a. m. materially aided the formation.

As far as can be learned, the fog at its greatest density extended a distance of about five miles east of the Niagara River, while in a condition of less density it doubtless extended considerably beyond that limit.

The frostwork on trees and other objects had a thickness of one-eighth inch or more and was quite evenly distributed over their entire surfaces. Ordinarily we find hoarfrost on but one side of objects, but in this case its deposit on all sides was evidently due to the very sluggish air movement.

Fogs like that of February 15–16 are very rare in this locality, owing to the usually rapid movement of the air, especially from the directions in which the lake and river lie.

HAWAIIAN CLIMATOLOGICAL DATA.

By CURTIS J. LYONS, Territorial Meteorologist.

GENERAL SUMMARY FOR MARCH, 1902.

The level of water in the artesian well rose during the month from 33.80 to 34.05 feet above mean sea level. April 1, 1901, it stood at 34.30. The average daily mean sea level for the month was 9.85 feet on the scale, 10.00 representing the assumed annual mean.

Trade wind days, 23 (1 of north-northeast); normal, 18; average force of wind (during daylight), Beaufort scale, 3.0; cloudiness, tenths of sky, 6.0; normal, tenths of sky, 4.6.

Approximate percentages of district rainfall as compared with normal: Hilo, 420; Hamakua, 520; Kohala, 480; Waimea, 530; Kona, 300; Kau, 200; Puna, 700; Olaa, 300; Maui, 300 to 500; Oahu, 300; Kauai, 380.

Mean temperatures: Pepeekeo, Hilo district, 100 feet elevation, average maximum, 73.7°; average minimum, 66.4°; Waimea, Hawaii, 2,730 elevation, 73.5° and 60.2°; Kohala, 521 elevation, 73.4° and 64.0°; Waiakea, Kula, Maui, 2,700 elevation, 74.2° and 57.3°; United States Magnetic Observatory, 81.7° and 64.6°; W. R. Castle, 60 feet elevation, highest, 79.5°; lowest, 62.5°; mean temperature, 70.4°.

Rainfall data.

Stations.	Elevation.	March, 1902.
HAWAII.		
HILO, e. and ne.	*Feet.*	*Inches.*
Waiakea	50	55.16
Hilo (town)	100	58.57
Kaumana	1,250	83.83
Pepeekeo	100	67.29
Hakalau	200	61.84
Honohina	300	90.85
Laupahoehoe	500	88.92
Ookala	400	94.35
HAMAKUA, ne.		
Kukaiau	250	62.76
Do	900	73.82
Do	1,520	93.39
Do	3,300	78.30
Do	5,000	27.01
Paauilo	750	......
Paauhau (Mill)	300	48.45
Paauhau (Greig)	1,150	......
Honokaa (Muir)	425	49.24
Honokaa (Rickard)	1,900	......
Kukuihaele	700	42.61
KOHALA, n.		
Awini Ranch	1,100	......
Niulii	200	27.43
Kohala (Mission)	521	26.09
Kohala (Sugar Co.)	235	21.05
Hawi Mill	600	28.20
Puuhue Ranch	1,847	30.51
Waimea, e	2,720	27.34
KONA, w.		
Kailua	950	......
Holualoa	1,350	10.17
Kealakekua	1,580	10.17
Napoopoo	25	6.85
KAU, se.		
Kahuku Ranch	1,680	3.89
Waiohinu	1,000	10.59
Honuapo	15	9.52
Naalehu	650	10.31
Hilea	310	9.00
Pahala	850	......
Moaula	1,700	......
PUNA, e.		
Volcano House	4,000	22.21
Olaa	1,690	74.76
Olaa (17-mile)	221	......
Kapoho	110	64.32
Kalapana, se	8	......
MAUI.		
Waiopae Ranch, s	700	......
Kaupo (Mokulau), s	285	34.49
Kipahulu, s	300	43.89
Hamoa Plantation, se	60	24.28
Nahiku, ne	60	......
MAUI—*Continued.*	*Feet.*	*Inches.*
Nahiku (Pogue)	1,600	102.46
Nahiku	800	74.65
Haiku, n	700	28.19
Kula (Waiakoa)	2,700	14.37
Kula (Erehwon), n	4,500	25.64
Puuomalei, n	1,400	40.62
Paia, n	180	22.11
Haleakala Ranch, n	2,000	43.91
Wailuku, ne	200	12.43
OAHU.		
Punahou (W. B.), sw	47	11.67
Kulaokahua, sw	50	11.95
Makiki Reservoir	120	14.25
U. S. Naval Station, sw	6	11.64
Kapiolani Park, sw	10	7.84
Manoa (Woodlawn Dairy), e	285	25.52
School street (Bishop), sw	50	11.31
Pacific Heights, sw	700	22.40
Insane Asylum, sw	30	13.61
Kamehameha School	75	18.01
Kalihi-Uka, sw	260	29.91
Nuuanu (W. W. Hall), sw	50	13.24
Nuuanu (Wyllie street), sw	250	......
Nuuanu (Elec. Station), sw	405	21.21
Nuuanu (Luakaha), e	850	44.25
Waimanalo, ne	25	17.06
Maunawili, ne	300	15.31
Kaneohe, ne	100	......
Ahuimanu, ne	350	14.51
Kahuku, n	25	7.90
Waialua, n	20	6.26
Wahiawa, c	900	9.81
Ewa Plantation, s	60	7.68
Waipahu, s	200	9.53
Moanalua, sw	15	13.59
Magnetic Station	50	6.62
KAUAI.		
Lihue (Grove Farm), e	200	19.79
Lihue (Molokoa), e	300	19.45
Lihue (Kukaua), e	1,000	32.50
Kealia, e	15	24.35
Kilauea, ne	325	31.95
Hanalei, n	10	36.50
Waiawa, sw	32	8.15
Eleele, s	200	......
Wahiawa Mountain, s	2,100	......
McBryde (Residence)	850	29.20
Lawai	450	28.97
Delayed February reports.		
Ookala	......	9.29
Moaula	......	1.30
Kapoho	......	0.43

The principal features of the month were the heavy storms which characterized the first and last 10-day periods, with continuous fine weather in most parts during the middle of the month. A northeasterly storm set in on the 27th of February, and was recognized on Hawaii Island as a norther. At the foot of the north slopes of Mauna Kea, Mauna Loa, and Haleakala the rainfall was unparalled; at Kukaiau, Hamakua, Hawaii 1,600 elevation, 62 inches fell in four days, and 82 in eight days.

The storm which set in on the 18th was of similar character, but with less wind and with unusual electrical disturbance. At Luakaha, Nuuanu, 5 miles from the Honolulu post office, 5.55 inches fell in fifty minutes, on the 18th. The heaviest record for the calendar month was 102.46 inches at Nahiku, Maui, at 1,600 feet elevation, which may probably challenge the world's record. Ookala had 94.35 inches. Kukaiau as above 93.39 for the month, and 103 for 33 days, beginning February 27. Other heavy totals will be found in the table of rainfall.

These terrific downpours come with northerly winds following southerly airs which strike the abrupt northern slopes of the islands, so that there is combined the condensation due to the upward movement of the air, with that due to the sudden impact of a cold current upon a nearly stationary mass of warm, moist air surrounding a mountain. Neither of these

causes in itself would produce such results, but combined they do bring on these so-called "cloud-bursts." From my observation on these islands, as well as in the States, I am inclined to think that meteorologists altogether undervalue the latter cause.

Snow fell on Mauna Kea, Mauna Loa, and Haleakala during these storms.

An earthquake was reported at Hilo March 30, 10:9 p. m.

Heavy surf 1st to 7th; 15th to 24th.

Mr. Fleming, at the Magnetic Observatory, reports the mean dew-point, 62.6°; relative humidity, 73.4. Dr. Bond, Kohala, reports mean dew-point, 64.1°; mean relative humidity, 86.

OBSERVATIONS AT HONOLULU.

The station is at 21° 18′ N., 157° 50′ W.

Hawaiian standard time is 10h 30m slow of Greenwich time. Honolulu local mean time is 10h 31m slow of Greenwich.

Pressure is corrected for temperature and reduced to sea level, and the gravity correction, —0.06, has been applied.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force, or amounts of cloudiness, connected by a dash, indicate change from one to the other.

The rainfall for twenty-four hours is measured at 9 a. m. local, or 7.31 p. m., Greenwich time, on the respective dates.

The rain gage, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet, and the barometer 50 feet above sea level.

Meteorological Observations at Honolulu, March, 1902.

Date.	Pressure at sea level.	Temperature.		During twenty-four hours preceding 1 p. m. Greenwich time, or 1:30 a. m. Honolulu time.									Total rainfall at 9 a. m., local time.
				Temperature.		Means.		Wind.		Average cloudiness.	Sea-level pressures.		
		Dry bulb.	Wet bulb.	Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.		Maximum.	Minimum.	
	*	†	†			‡	‡		§				
1	30.05	67	58.5	72	63	54.0	65	nne-sw.	6-2	4	30.09	29.99	0.01
2	30.06	68	60	73	65	54.5	60	ne.	6-7	5	30.12	30.03	0.04
3	30.06	68	62	74	66	56.7	64	ne.	5-6	4	30.14	30.05	0.24
4	30.02	70	63	74	65	58.5	67	ne.	6-7	6-10	30.10	29.98	0.80
5	29.99	69	61	71	65	59.3	72	ne.	5-7	10	30.10	29.98	1.60
6	29.97	68	66	73	66	59.3	72	ne.	5-7	8	30.02	29.93	0.90
7	30.05	68	64	73	67	64.3	86	ne.	4	9	30.07	29.96	0.70
8	30.04	68	62.5	72	67	61.3	75	ne.	4-5	4	30.09	30.01	0.02
9	30.01	63	62	74	67	60.3	72	ne.	4-0	6-10	30.07	30.00	0.02
10	30.01	63	62	78	62	62.5	77	ne.	0-4	3	30.05	29.96	0.00
11	30.00	63	62.3	79	62	63.5	81	ne-se.	0-2	3-0	30.06	29.95	0.00
12	30.00	65	63.7	78	63	64.7	85	se.	1-0	1-4	30.02	29.94	0.00
13	30.02	62	61.3	80	63	63.7	80	se-ne.	1	3-0	30.07	29.96	0.00
14	30.04	65	63	79	61	63.5	78	ne.	2	2	30.07	29.98	0.00
15	30.00	71	67	79	63	64.7	77	ne.	3-0	1	30.08	29.97	0.00
16	29.98	71	64	79	70	63.3	72	ne.	3	4	30.07	29.95	0.00
17	29.96	67	64	78	70	61.5	72	ne.	3	6-1	30.06	29.96	0.13
18	29.94	67	64.5	76	63	61.5	72	ne-e.	5-1	7-1	29.99	29.92	0.23
19	29.89	65	63	73	64	63.0	78	ne.	3	8-3	29.99	29.90	0.01
20	29.95	66	63.5	79	65	62.3	75	ne.	3-4	2	29.99	29.89	0.02
21	29.95	70	67.5	79	65	63.3	75	se-ne.	2	4	30.02	29.90	0.06
22	29.97	69	66	75	70	64.7	78	ne.	3-4	8	30.06	29.98	0.80
23	29.96	71	64	75	68	63.7	76	ne.	3-5	9	30.04	29.95	0.03
24	29.99	71	66.5	74	71	62.7	75	ne.	4	9	30.06	29.97	0.34
25	29.91	71	68.5	74	69	64.7	78	ne.	4-5	10	30.02	29.91	0.66
26	29.87	68	67	77	71	68.5	89	ne-se.	1-0	8-10	29.95	29.86	0.80
27	29.86	69	68.3	79	66	70.0	89	s.	1-2	4-10	29.93	29.85	0.48
28	29.90	70	69	73	68	68.5	95	se.	1	10	29.96	29.86	1.64
29	29.89	70	69.3	76	66	69.0	91	sw.	1-0	10	29.95	29.85	0.28
30	29.82	69	67.5	77	69	69.0	88	sw-ne.	1-0	10	29.95	29.82	0.06
31	29.79	64.7	64.3	77	67	66.5	88	s-n.	1-2	10	29.85	29.76	1.80
Sums													
Means	29.966	67.6	64.2	75.9	66.5	63.4	78.2		3.0	6.0	30.033	29.935	11.67
Departure	—.041					+2.0	+5.0			+1.4			+7.96

Mean temperature for March, 1902, (6 + 2 + 9) ÷ 3 = 70.8; normal is 70.8. Mean pressure for March, 1902, (9 + 3) ÷ 2 = 29.976; normal is 30.017.

* This pressure is as recorded at 1 p. m., Greenwich time. † These temperatures are observed at 6 a. m., local, or 4.31 p. m., Greenwich time. ‡ These values are the means of (6 + 9 + 2 + 9) ÷ 4. § Beaufort scale.

CLIMATOLOGY OF COSTA RICA.

Communicated by H. PITTIER, Director, Physical Geographic Institute.

[For tables see page 156.]

Notes on the weather.—On the Pacific side the weather was fair and fine, excepting a few days with occasional showers at the beginning and toward the end of the month. In San Jose the air pressure was generally above normal up to the 15th and below normal after that date. The temperature was about normal, while the dryness of the atmosphere was remarkable. Although there were four days of rainfall (against two, mean number for thirteen years), the sunshine was nearly fifty hours in excess of the normal. On the Atlantic side there was little rain, and the weather was generally fine.

Notes on earthquakes.—March 18, $5^h\ 44^m$ p. m., slight shock, NW-SE, intensity III, duration 7 seconds.

FURTHER EXPLANATIONS.

By SIMON NEWCOMB, dated January 20, 1902.

Not until a few days ago was I aware that a paper asking certain critical questions about statements on meteorological subjects made by me in a popular article, had appeared in the MONTHLY WEATHER REVIEW for August, 1901. I shall take up the three points in question, seriatum.

The first concerns the cause of rain. I think it quite likely that I may be wrong in this point, and, therefore, shall not argue it, but merely remark that I have not yet seen any explanation of an all-day rain which seemed to me any more satisfactory than the old one which I mentioned.

The second point at issue is the cause of a thunderstorm. I attributed this to a rise of warm air and a fall of cold air to take its place. On this the Editor remarks: "The development of electricity by the rise of hot air and the descent of cold air is, we believe, a new thought in the physics of the atmosphere."

This remark seems to show that theoretical meteorology is either much less advanced or much more advanced than I had supposed. The above view was based purely on those casual observations which everyone may make in the course of his life. When, however, they are challenged, one hardly knows where to begin. I shall, therefore, confine myself to a statement of propositions, asking the Editor to point out where his dissent comes in:

(1) In spring and early summer it frequently happens that the excess of temperature of the air near the ground above that at a higher elevation is greater than the excess in a state of adiabatic equilibrium.

(2) The necessary result of this state of things is an instability of equilibrium. The colder air above at some point breaks through the stratum of warm air below and the latter rises up to take its place.

(3) The result is a colder wind blowing away from the place where the descent occurs and toward the place where the air is ascending. We thus have the familiar phenomenon at the commencement of a thundershower, when for a few minutes a heavy wind blows away from the seat of the storm.

(4) This state of things is nearly always accompanied by lightning, and the other phenomena of a thunderstorm.

(5) Lightning is produced by an electric disturbance and involves a generation of electric potential. Why or how the motion of the air should generate this potential, I must leave to others.

All I am stating are what appear to me the observed facts. If my propositions are wrong, I should like to have them corrected by a clear statement of the facts and causes of a thunderstorm.

The third point surprises me yet more, unless the Editor misapprehends my meaning when I speak of winds blowing in opposite directions. By this expression I meant merely opposite directions relative to the center of the advancing storm, or the center of disturbance. Different directions, would have been sufficient to say.

The Editor remarks: "The formation of a cyclone or whirlwind, as a consequence of winds blowing in opposite directions, is another theory long since abandoned. His omission of my phrase "near the place where the volume rises," I leave him to explain.

I hardly know how to answer what seems to me a challenge of the fundamental laws of aerodynamics. According to these laws, when a volume of air rises, the air from the surrounding regions must flow in to take its place. If the air thus flowing in has no motion except that toward the center, there can be no whirlwind or cyclone; but if it is moving in opposite or different directions on the two sides of the storm center, it follows from the theory of hydrodynamics that a cyclonic motion or whirlwind will result.

The preceding reply by Professor Newcomb is quite satisfactory as to his views relative to these interesting points, but the following additional note by the Editor gives the views of some meteorologists.

1. With regard to the formation of rain we accept the principle developed by Espy, namely, that the rain comes from clouds formed by the cooling of ascending currents of moist air. This cooling is due primarily to the fact that when the air ascends by any natural process it also expands, and, therefore, pushes the surrounding air aside. But push and expansion mean that work is being done. The expansion of steam in a cylinder pushes the piston ahead and does the work of the engine, but this work is done at the expense of the heat in the hot steam, and the latter cools just in proportion as the work is done. We ordinarily say that the internal heat of the steam is converted into visible work, or the potential energy of pressure is converted into kinetic energy of motion. Just so with the rising air; it expands, does work, and cools at a rather rapid rate as it rises (1° F. for 185 feet). If it rises until it cools to the temperature of saturation at which it can hold no more moisture than that which is carried up with it, then, condensation begins and haze or cloud becomes visible. But in this condensation the latent heat of the condensed moisture is given out, thereby preventing the air from cooling as rapidly as it has hitherto done. It therefore now begins to cool less rapidly and to ascend more rapidly.

The radiation of heat from the upper surface of a cloud at night, or the absorption of the sun's heat in the daytime, has less influence when the ascending air rises rapidly than when it rises slowly. The latter case occurs in our extended rainstorms, especially those over the ocean where the clouds often travel at the rate of 100 miles an hour, and the individual particles of air appear to rise relatively very little, possibly a mile in that distance, but, of course, rolling over and over each other as they proceed. Some idea of the laws of cooling and of the formation of cloud in such ascending currents as occur when a broad layer of air flows from the ocean landward over a range of mountains, is given in an article by Professor Pockels, translated and printed in the MONTHLY WEATHER REVIEW for April, 1901. There is no doubt but that a little mixture goes on at the boundary of the ascending air between it and the neighboring air, but, on the one hand, this is too small a matter to explain the formation of rain on the outside of a cloud, and, on the other hand, it does not occur at all in the interior of a cumulus cloud where the rainfall is heaviest.

Just how the particles of cloud happen to come together, or to grow into big drops, has not yet been clearly explained, but in general we know that only a small proportion, possibly one per cent, of all the moisture in a cloud comes down as rain, while the rest of the cloud evaporates and disappears.

2. The second point under discussion is not precisely "the cause of a thunderstorm." There is no question as to the mechanism of thunderstorms. They are certainly composed of ascending currents which form clouds from which we get rain, lightning, and thunder. The point at issue is as to the process by which electricity and lightning are formed. According to the original statement in Leslie's Weekly, as quoted in the MONTHLY WEATHER REVIEW for August, 1901, page 377: "The expanded hot air tends to rise, and as it does so the air from around flows down and in and takes its place. By this change electricity is developed, and thus we may have a thunderstorm."

This development of electricity by the rising of hot air, or the inflow of other air, is the hypothesis that we orginally objected to as one that has not yet been accepted by electricians; still it may be true, and we hoped that Professor Newcomb would explain its reasonability. In his reply he simply states that "lightning is produced by an electric disturbance and involves a generation of electrical potential." This is, of course, merely another way of stating the same thing. It is considered necessary by physicists to explain, first, how the atmosphere or the vapor particles come to be electrified at all, as we know they are, and second, how the gentle electrification of the atmosphere can give rise to the powerful lightning flashes of a thunderstorm. During the past few years J. J. Thomson and C. T. R. Wilson have made it appear plausible that condensation in saturated air begins preferably on the negative ions, and that in this way the raindrops bring the negative electricity down to the earth and leave the free positive electricity behind in the atmosphere. Elster and Geitel have also accepted this view, but it may be modified by the next step in our knowledge. In view of all that has been said on this subject for a hundred years past, there would seem to be no reason for suggesting that the ascent of hot air and the inflow of other air developes electricity, but a new view quite recently suggested by Dr. Linke of Potsdam, shows in what way this may be said to be true.

3. Passing to the third point we objected to the original expression, "When winds are blowing in opposite directions, near the place where the volume of air rises, we may have a whirlwind or cyclone." It was an old observation that eddies of water are formed between currents moving in opposite directions or between a swift current and a body of quiet water. Having once been formed the eddies move away and are soon broken up by friction and irregular motions. Analogous to these are the eddies of wind and dust blowing around the corner of a building; but the whirlwinds of meteorology, viz., the water-spouts, tornadoes, hurricanes, and typhoons involve a different principle. These may form between winds blowing in opposite directions, but the logical mechanics is, first, an indraught of air toward the center, producing gentle winds, then, the deflection of the winds by the rotation of the earth, producing strong whirls. So far as the direct indraught is concerned it can only produce winds blowing from all sides straight to the center, where they might possibly rise up and flow back upon themselves so that each particle of air might move in a nearly vertical plane. The irregularities of the earth's surface, or inequalities of friction, or temperature, or moisture, may induce horizontal whirls in connection with the vertical motion, but they will be as often to the right as to the left. It is to the credit of Ferrel that he demonstrated that our whirlwinds actually owe their direction of whirl wholly to the rotation of the earth on its axis and he especially opposed the idea that whirlwinds are formed as a consequence of, or between winds blowing in opposite directions. It is perfectly true that when we have a whirlwind the air is moving in nearly opposite directions on opposite sides of the storm center; therefore, when the weather map shows us spirally-incurving winds on the opposite sides of an area of low pressure, we may think of these opposing winds as constituting a cyclonic whirl, or a whirlwind, but not as causing it. About 1890 Professor Hann showed that in some storms there is often an absence of buoyancy in the cloud region, and that, therefore, we must look elsewhere for the force that maintains the whirlwinds. There is, therefore, a tendency to allow that the general currents of the atmosphere must contribute their surplus energy to the maintenance of hurricanes and cyclones. How-

ever this may be, the initial whirl is, we suppose, always due to the systematic deflection of inblowing winds by the diurnal rotation of the earth.—*C. A.*

SOME EXPERIMENTS IN ATMIDOMETRY.

By JAMES S. STEVENS, Professor of Physics, University of Maine, dated February 25, 1902.

An attempt has been made at the University of Maine to establish a course in meteorology. The course includes both class-room and laboratory work. In connection with this work certain experiments in evaporation were assigned to a student, Miss M. C. Rice, the results of which are embodied in this paper. Very little originality is claimed for the methods and no new results have been obtained, but it was thought that some of the conclusions reached might prove of interest to workers in this field.

The principal object of the experiments was to compare the relative rates of evaporation of certain liquids under different conditions of temperature, surface, wind velocity, etc. Two Babington's atmidometers (A and B) were employed, one of which is shown in fig. 1.

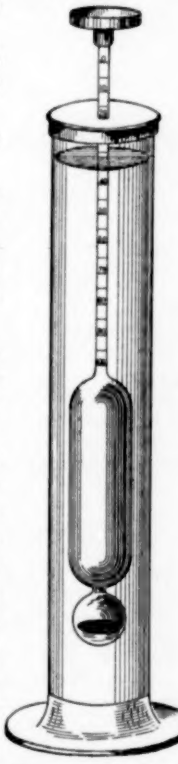

FIG. 1.—Babington's atmidometer.

The scale divisions on each instrument were carefully calibrated, and the following constants determined:

A, 15.4 grams per division; B, 25.3 grams per division.

That is to say, it required these masses to be placed in the upper pan to depress each stem through one scale division. It is obvious therefore that the total evaporation in the pan of A which would cause a rise of one division, would be equivalentto 15.4 grams.

The pans used had slightly different diameters, so that the surface areas exposed were as follows: A : B : : 7.1 : 6.2. The areas are expressed in square centimeters.

The observations were made by filling the pans with the liquids to be tested, then focusing the cross wire of a telescope on a certain division on the scale, and noting the rise due to evaporation in given intervals. That the evaporation rates were fairly constant is shown by the figures in Table 1 and curves [curves omitted] which give an idea of the nature and results of the experiments with ether and alcohol. The time interval was five minutes, and there are recorded the corresponding scale readings, the rise due to evaporation and the equivalent in grams for each liquid. Both these sets of observations were made simultaneously. When the surface of B is reduced to the same dimensions as that of A it is seen that ether evaporates nearly ten times as rapidly as alcohol.

In Table 2 the conclusions of a series of observations similar to those in Table 1 are given. The temperature, pressure, and relative humidity were kept fairly constant. Expressing these results relatively, water being taken as unity, we have the following: Water, 1.0; alcohol, 3.2; carbon bisulphide, 8.8; ether, 28.8; chloroform, 40.0.

In Table 3 a comparison is made of the relation of evaporation to the extent of surface. If we multiply the evaporation of A by the surface of B it should equal the evaporation of B multiplied by the surface of A. Our result gives 0.248 and 0.247, respectively, which shows that within the limits of the accuracy of the experiment evaporation is proportional to the extent of the surface.

TABLE 1.—*Ether and alcohol.*

Periods.	Ether, A.			Alcohol, B.		
	Readings.	Differences.	Grams.	Readings.	Differences.	Grams.
h. m.						
1:51	2.8	.....	.....	6.6	.....	.....
56	9.2	6.4	0.41	7.5	0.9	0.03
2:01	15.3	6.1	0.39	8.5	1.0	0.03
06	20.9	5.6	0.36	9.4	0.9	0.03
11	26.9	6.0	0.38	10.4	1.0	0.03
16	32.7	5.8	0.37	11.6	1.2	0.04
21	37.8	5.1	0.32	12.5	0.9	0.03
26	42.9	5.1	0.32	13.6	1.1	0.04
31	48.4	5.5	0.36	14.8	1.2	0.04
36	54.8	5.4	0.35	15.7	0.9	0.03
41	60.5	5.7	0.37	16.7	1.0	0.03

Mean, A, 0.36. Mean, B, 0.033. B reduced to surface area of A = 0.038.
Temperature, 23.0° C. Pressure, 758.9 mm. Relative humidity, 42 per cent.

TABLE 2.—*Conclusions from experiments with various liquids.*

Liquids.	Periods.	Evaporation ratios.	Temperature.	Pressure.	Relative humidity.
	Minutes.		°C.	*Mm.*	%
Water and alcohol	10	0.024 : 0.08	24.7	748.5	41
Chloroform and carbon bisulphide.	1	0.10 : 0.022	23.3	753.8	50

TABLE 3.—*Comparison of surface areas. Chloroform.*

Periods.	Readings.	Differences.	Grams, A.	Readings.	Differences.	Grams, B.
h. m.						
9:58	3.0	.....	.....	1.0	.....	.....
59	4.5	1.5	0.05	1.5	0.5	0.032
10:00	5.5	1.0	0.03	2.0	0.5	0.032
01	6.8	1.3	0.05	2.4	0.4	0.026
02	7.8	1.0	0.03	3.1	0.7	0.045
03	8.9	1.1	0.04	3.8	0.7	0.045
04	9.9	1.0	0.03	4.4	0.6	0.039
05	11.0	1.1	0.04	4.9	0.5	0.032
06	12.0	1.0	0.03	5.4	0.5	0.032
07	13.3	1.3	0.05	5.8	0.4	0.026
08	14.8	1.5	0.05	6.4	0.6	0.039

Mean, A, 0.040. Mean, B, 0.0348. Ratio of surfaces, 7.1 : 6.2.
Temperature, 16.6°, C. Pressure, 769.9. Relative humidity, 45 per cent.

Table 4 indicates that the *relative* evaporation of liquids is approximately constant, and is independent of the velocity of the wind over the exposed surface. In the above work the temperature was different under the two conditions by an average of about 12° C. It was determined that in the case of ether a difference of 1° C. corresponded to a difference of about 0.001 gram per minute.

TABLE 4.—*Rate of evaporation with and without wind.*

Liquids.	Evaporation per minute (no wind).	Velocity of wind, feet per minute.	Corresponding evaporation.
Alcohol	0.007	188	0.03
Chloroform	0.04	200	0.16
Ether	0.072	220	0.28

[NOTE.—In the interest of meteorology it is to be hoped that the author will extend these observations so as to include sea water and fresh water of different temperatures, as also snow and ice, so that we may have some idea of the relative evaporations on different portions of our globe.—*C. A.*

NOTES AND EXTRACTS.

PRIZE FOR PRESSURE ANEMOMETER.

[Translated from the Meteorologische Zeitschrift, January, 1902.]

In order to obtain the best apparatus for measuring the pressure of the wind, competition is invited by all persons within and without Germany. The following prizes for the best devices will be awarded: First prize, 5,000 marks (about $1,250); second prize, 3,000 marks ($750); third prize, 2,000 marks ($500). Moreover, the competitor whose apparatus shall after long continued observation be found to be most appropriate for official purposes will receive a further prize of 3,000 marks ($750).

The designs of the apparatus (Entwürfe) must be received by April 15, 1903, at the Deutsche Seewarte in Hamburg. The programme can be obtained gratuitously from the geheime registratur D of the ministry of public works.

Signed by the minister of public works and also in the name of the secretary of state for the imperial marine, for the minister of war, for the minister of commerce and manufactures, for the central council of the union of Prussian steam engine inspectors, and for the union of German engineers.

REQUIREMENTS FOR THE COMPETITION RELATIVE TO AN APPARATUS FOR MEASURING THE PRESSURE OF THE WIND.

A. Technical conditions.

1. The pressure gage must be so arranged as to allow such a determination of the average force of wind pressure on surfaces and solids, including any possible suction that may be present on the leeside, that the results of the observations can be utilized for static computations.

2. It is desired that the wind gage shall indicate with certainty the location of the measured average force [resultant?] relative to the surface.

3. The gage must make such an automatic registration of the pressure of the wind that there may be available a continuous graphic presentation of the changes of the wind pressure with the lapse of time.

4. It is especially to be noted that arrangements that determine the wind pressure indirectly by the measurement of the wind velocity do not correspond to the demands of this competition.

B. Instructions for the competition.

1. The competition is open to persons of all nationalities.

2. The competitor must deliver either a gage constructed according to his design or a working model, and with the latter, as explanatory thereto, the necessary drawings and computations. Both the apparatus and the models are to be sent by the competitors at their own cost and free from all other charges to the Deutsche Seewarte, Hamburg.

3. All competing apparatus must be received, with an assumed name or mark for identification, by or before April 1, 1903, at the Deutsche Seewarte in Hamburg which will carry out the testing of the gages. Designs coming later than this will not be considered. Separate from the designs of apparatus, there is to be sent a sealed envelope bearing the same assumed name or sign, and which must contain within *(a)* the address to which the competing apparatus can be returned or under which the sender can be communicated with; for foreign competitors there must be the address of some representative living in Germany. *(b)* A second sealed envelope containing the name of the sender. This envelope will only be opened in the case of the apparatus that receives a prize.

4. For the apparatus that best satisfies the conditions mentioned in section A, there will be awarded a first prize of 5,000 marks, a second prize of 3,000 marks, and a third prize of 2,000 marks. Moreover, the competitor whose apparatus shall, after a long series of observations, prove to be the most appropriate for official use, will receive a further prize of 3,000 marks. But this successful competitor must, before this additional prize is paid to him, state how many pressure gages of this particular kind he is ready to deliver, at a price to be named by him, to all the officials and societies that offer the prize.

5. The successful designs become the property of the Deutsche Seewarte in Hamburg. The competitors are requested to protect themselves by securing patent rights on their designs before sending them in to the competition.

6. The results of the competition will be announced in the Deutscher Reiches-Anzeiger, the Königlich Preussischer Staatsanzeiger, and the Centralblatt der Bauverwaltung.

The details of the award will be published in the Centralblatt der Bauverwaltung and will moreover be sent to each prize winner.

The designs which do not receive prizes will, after the award of the prize committee, be returned to the given addresses.—*C. A.*

WEATHER BUREAU MEN AS INSTRUCTORS AND LECTURERS.

The following is from the San Francisco Chronicle of February 9, 1902:

> "The phenomena of fogs" was the subject presented to a full lecture hall at the Mechanics' Library last night by Prof. Alexander G. McAdie, Forecast Official of this city. Fifty unusually beautiful photographic views of fog fields witnessed at different times from the summit of Mount Tamalpais, near the Golden Gate, were thrown upon a steoropticon screen and were said to be the finest picturesque fog effects ever taken with a camera anywhere. They were the result of the best of all the pictures made under Professor McAdie's direction during nearly three years. The lecturer explained how very deceptive sound waves became in a thick fog, and illustrated his point by a detailed reference to the loss a year ago of the steamship *Rio* and 130 lives. He distinguished between sea fogs of summer and tule fogs of winter, between the dust fog of the interior and the town fog such as London suffers from.

Mr. J. B. Marbury, Section Director, Atlanta, Ga., lectured before the Donald Frazier School for Boys at Decatur, Ga., on February 14. His subject was "Meteorology and forecasting," and among other points discussed were the following: The atmosphere and its functions; the relation of temperature to the development of storms; the method of making observations; the construction of the daily weather map; the making and distribution of weather forecasts; the development and progress of areas of high and low barometer in the United States.

Dr. W. M. Wilson, Section Director, Milwaukee, Wis., presented the work of the Weather Bureau in connection with agriculture before the Farmers' Institute at Barraboo, Wis., on the afternoon of February 18, and before the Institute at Lodi on the evening of the same day. He took occasion to expose the fallacy of many popular traditions with respect to the weather. He reports an urgent demand for the distribution of forecasts by means of the rural free delivery service.

Mr. P. H. Smyth, Observer, Cairo, Ill., lectured before the students and faculty of the Southern Illinois State Normal University, Carbondale, Ill., on February 18, his subject being "The general work of the Weather Bureau." He also addressed the physical geography class on "The movement of tropical cyclones," and the physics class on Weather Bureau instruments, the use of psychrometric tables, and the drawing of isobars and isotherms.

Mr. L. H. Murdock, Section Director, Salt Lake City, Utah, addressed the Polysophical Society of the Brigham Young

Academy, on "The Weather Bureau and its work," on the evening of February 21, illustrating his remarks by means of lantern slides.

Mr. J. Warren Smith, Section Director, Columbus, Ohio, visited the Farmers' Institute at Cridersville, Ohio, on February 28. At the morning session he delivered an address on "The work of the United States Weather Bureau and its relation to agriculture," in which he briefly outlined the general circulation of the atmosphere, the characteristics of the various atmospheric disturbances, both primary and secondary, the distinctive features of the three general cloud types, some phases of atmospheric electricity, and a brief history of the development of the observational work of the Weather Bureau.

At the afternoon session he again addressed the Institute, his subject being "Forecasts and warnings—how made, distributed, and utilized." The gradual expansion of the forecast system in the interest of the farmers, how best to profit by temperature forecasts and frost warnings, and methods of protection against frost, were among the subjects discussed.—*H. H. K.*

BACK NUMBERS OF THE REVIEW WANTED.

A correspondent wishes to obtain copies of the MONTHLY WEATHER REVIEW for February, 1884, and September, 1885, to complete his file. Volumes I to XIV, inclusive, and Volume XV, No. 2, are also desired to complete a set for a scientific library. Any one having these REVIEWS to dispose of will confer a favor by informing the Editor.

HOURLY TEMPERATURES FOR BALTIMORE, MD.

In the report for January, 1902, of the Maryland and Delaware section of the Climate and Crop Service, the Director, Dr. Oliver L. Fassig, states that a thermograph has been in use at the Baltimore office of the United States Weather Bureau since the first of January, 1893. From the record sheets of this instrument the average hourly values of temperature for each month have been computed for the nine years from 1893 to 1901. In the accompanying diagram, fig. 1, these values are graphically represented for the months of January, April, July, and October, and for the year as derived from the twelve monthly values. According to customary nomenclature the average temperature of any month is derived from the 24 hourly averages; we find for each month the following agreement between the averages for nine years of daily maximum and minimum temperatures, and of the 24 hourly observations:

$$\text{January } \frac{(\text{max.} + \text{min.})}{2} - \text{monthly average} = +0.3^\circ$$

April " " " " $= +0.0^\circ$
July " " " " $= -0.1^\circ$
October " " " " $= +0.4^\circ$

The difference between the averages of the 8 a. m. and 8 p. m. temperatures and the monthly averages are as follows:

$$\text{January } \frac{8 \text{ a. m.} + 8 \text{ p. m.}}{2} - \text{monthly averages} = -1.1^\circ$$

April " " " " $= -0.8^\circ$
July " " " " $= -0.7^\circ$
October " " " " $= -1.6^\circ$

The mean annual temperature for each hour for the nine years of record is given in the following table:

	1	2	3	4	5	6	7	8	9	10	11	12	Average.
A. M. .	51.8	51.1	50.5	50.0	49.5	49.4	50.1	51.7	53.6	55.6	57.4	59.0	55.0
P. M. .	60.1	60.9	61.3	61.1	60.2	59.0	57.6	56.3	55.2	54.2	53.3	52.5	

The periodic daily amplitude in temperature is the difference between the highest and lowest hourly means. The aperiodic daily amplitude is the difference between the means of the maximum and the minimum temperatures. The latter is always the larger, because the extremes of temperature rarely occur at the moment an hourly reading is taken.

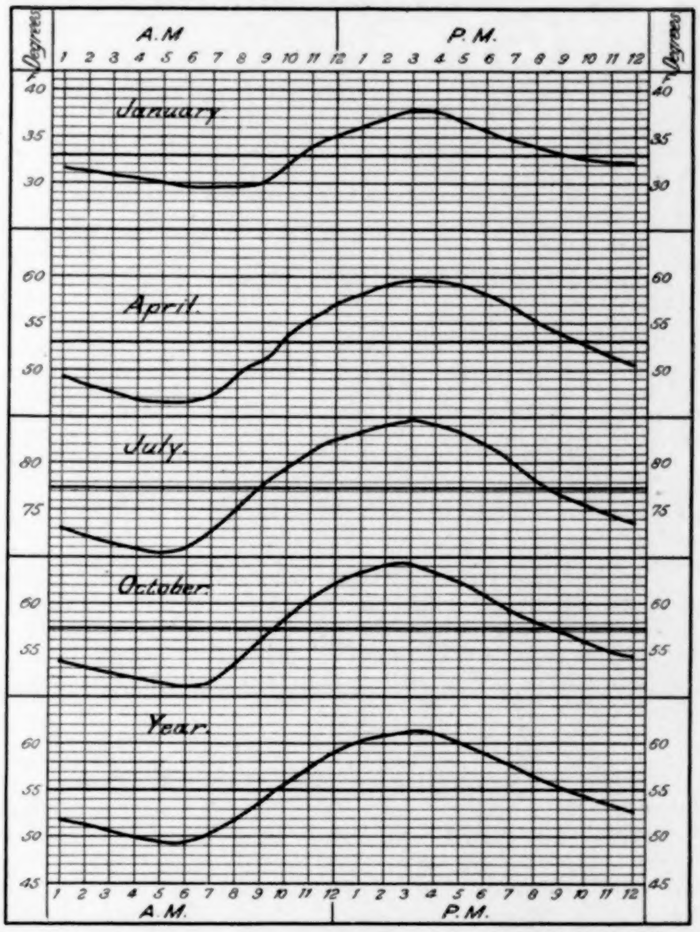

FIG. 1.—Average hourly temperature curves for Baltimore, Md., (1893-1901).

The following table shows the hours of occurrence of the periodic maximum, minimum, and mean temperatures for the different months and for the year.

Month.	Maximum. P. M.	Minimum. A. M.	Mean. A. M.	Mean. P. M.
January	3	7	11	10
February	3	7	11	10
March	3	6	10	10
April	3	6	10	10
May	3	5	9	9
June	3	5	9	9
July	3	5	9	9
August	3	5	9	9
September	3	6	9	9
October	3	6	10	9
November	3	7	10	9
December	3	7	10	9
Year	3	6	10	9

H. H. K.

METEOROLOGY AND THE SCHOOLS.

In his Report to the Secretary of Agriculture for the year ending June 30, 1901, the Chief of the Weather Bureau referred to the increasing demand for lectures and instructions by Weather Bureau officials before schools and colleges. That meteorology can be made an interesting study for the younger pupils as well as for the more advanced, is demon-

strated by the following extract from the Stevens Point Journal of January 25, 1902, descriptive of a geographical display at the Wisconsin State Normal School at that place:

There is in the geography room at the normal the most pleasing and instructive exhibition ever prepared by the school in that line. The work has been done by the students through Miss De Riemer's suggestions. Miss De Riemer also furnished considerable material such as is not easily procured. A large part of the exhibit consists of pictures showing scenery, industries, cloud types, and racial characteristics.

* * * * * * *

Suspended from the ceiling is the model of a kite such as is used by the United States weather service for scientific purposes. A large number of very excellent maps are on exhibition, showing a variety of physical features. That which is most in evidence is a scrap book showing what a wealth of information may be put together in such form. The number and variety of the flags flying indicate all sorts of weather that the Bureau is able to provide.

In regard to the meteorological features of the display, Miss Alice De Riemer writes as follows:

In the meteorological corner we had weather maps, charts, many beautiful cloud and fog views, forms of snow crystals, models of weather vanes, rain gage, and anemometer, made by the students, with descriptions and cuts which I had collected. Indeed, it was a miniature exposition, and such a revelation to many of these young people who have had such limited opportunities.

Another time I plan to have several of the students give short talks, during certain hours, describing certain features of the several exhibits. However, our first attempt has been a grand success. All the city teachers were in to-day, and I have just had a communication from a superintendent in one of the adjoining towns asking for the privilege of bringing some of his teachers over to see it.

Miss De Riemer is to be congratulated upon the success of her exposition. Its installation and the preparation of the models of instruments were no doubt useful exercises in manual training, and the exhibition itself an excellent object lesson in meteorology. Other teachers will do well to use it as a model.—*H. H. K.*

PERNTER'S METEOROLOGICAL OPTICS.

The Director of the Central Institute for Meteorology and Terrestrial Magnetism, Prof. Dr. J. M. Pernter, has begun the publication of a work on meteorological optics (for sale by the firm of W. Braumueller of Vienna and Leipsic), which we most heartily commend to the numerous correspondents who write inquiring as to the explanation of the various optical phenomena that are to be observed in the sky. The first chapter of this work gives an account of the apparent curvature of the dome of the sky; of the connection between our estimates of angular altitudes and the true altitudes of objects seen in midheaven, explaining why such estimates differ in the presence of sunshine and moonshine, and why objects of a circular outline, such as halos, appear distorted into egg-shaped ovals. Professor Pernter has lectured and written frequently for twenty years past on this topic and the explanations of halos, parhelia, red sunsets, and other phenomena that will be given in another part of his volume will undoubtedly make available to us all that is known on the subject and all that is to be found in the very widely scattered literature. The Editor will occasionly translate portions of this volume for the benefit of the readers of the Review, but those who are at all familiar with German should possess the original.—*C. A.*

SECOND MEXICAN CONGRESS OF METEOROLOGY.

The Second National Meteorological Congress convened by the Scientific Society Antonio Alzate, in the City of Mexico, December 17–20, 1901, has published a short report from which we perceive that there is established a permanent committee of the International Meteorological Congress which prescribes the general character of these congresses as to membership and communications. The annual dues are $5, and the president of the committee is Señor Prof. Mariano Leal, Director of the Secondary School, Leon, Guanuajuato, Mexico. A preliminary program of this congress will be found in the Monthly Weather Review, November, 1901, page 512. About fifty members were present. Following the reading of papers, as announced in the preliminary program, corresponding resolutions were formulated and adopted expressing the opinions and wishes of the society. Among these we find under the heading "The prediction of the weather;" three relating to telegraphic work, a fourth urging the increase of stations for temperature and rainfall, a fifth urging the prediction of local weather for short periods, sixth, the study of methods of prediction for long periods, and, finally, that the local weather predictions be announced to the public by means of the signals used in the United States.

Under the heading of "Resolutions relative to the study of storms," the congress appointed a committee to collect data relative to the storms in Mexico and report to the next congress.

Under the heading of "Resolutions relative to self-registering apparatus" the congress recommends: (1) that important observatories constituting the centers of sectional systems of stations be provided with self-registers; (2) that the equipment for each station include thermograph, barograph, hygrograph, pluviograph, and anemograph; (3) said observatories publish the hourly values deduced from these curves in the "Annals of Mexican meteorology;" (4) that the permanent committee distribute instructions as to the use of these instruments.

Under the heading of "Resolutions relative to the applications of climatology to agriculture" the congress recommended: (1) that observations be made on the relation between rainfall and the superficial or subterranean deposits depending thereon within the national territory; (2) the coordination of rainfall with hygrometry both superficial and subterranean; (3) the appointment of a special commission to correspond with the government on these matters; (4) that the regulation of currents and deposits in rivers and lakes is necessary for the improvement of the public health and the preservation of the forests; (5) in order that these beneficial results may be attained, the congress recognizes the necessity of expedition in public works and legislation; (6) that meteorological observatories, when appropriately located, study *(a)* phenology, *(b)* actinometry, *(c)* the appearance of injurious insects, animals, fungi, and vegetables, *(d)* the prediction of hailstorms; (7) that the efforts being made in Europe to prevent hail by the firing of cannon be studied.

With reference to the thermometer exposure the congress appointed a committee to make a comparative study of the exposures used in Russia, France, and England, and of the aspiration thermometer of Assmann.

With reference to the dissemination of meteorological knowledge the congress recommended to the minister of public instruction and other authorities (1) that elementary meteorology be introduced into the primary schools; (2) that each school have a collection of instruments, and that the scholars in the last year of the course periodically assist in maintaining the station record; (3) that the meteorological bulletins be distributed freely, or at a very moderate price; (4) that there be a meteorological committee for each locality; (5) that the directors of the observatories be requested to publish promptly monthly summaries of local phenomena, especially rainfall; (6) that there be monthly public conferences relative to meteorology at educational centers and in scientific societies; (7) that whenever interesting meteorological phenomenon occur the directors or professor of physics explain them scientifically in the public press and seek to destroy popular prejudices and absurd theories; (8) that there be formed a general association of all the meteorologists of the republic to be known as the national association and having the per-

manent committee as its center; (9) that in connection with this organization the commitee appoint a local auxiliary council at the capital of each state or territory.

At the conclusion of the discussion of a memoir by Contreras, on the prediction of the seasons for long periods in advance, the congress adopted two resolutions requesting the Director of the Central Meteorological Observatory, Manuel E. Pastrana, to carry out a course of study based upon the ideas of Señor Contreras. Finally the congress recommends to the Mexican observatories their compliance with the resolutions of the international conference at Munich, the adoption of barometric readings reduced to normal gravity for all telegraphic work, and the statement in the published records as to how the values of the correction terms were obtained.—*C. A.*

GRADUATE STUDY AT WASHINGTON.

The Fifteenth Annual Convention of the Association of American Agricultural Colleges and Experiment Stations was held at Washington, D. C., November 12-14, 1901. Simultaneously with this, the Association of State Universities and the Society of Official Horticultural Inspectors held their meetings in Washington, D. C. From the report published editorially in the last number of the Experiment Station Record, Vol. XII, pp. 517-519, we note that several topics of general interest were discussed. President A. W. Harris of the University of Maine, as president of the convention, among other good things said: "If the agricultural college did nothing more than to establish, maintain, and officer the experiment station, it would be justified many times over."

This tribute to the importance of experimentation in agriculture applies equally to meteorology. Many of our own observers have suggested ideas in explanation of observed phenomena, or relative to unknown laws, that are very good as suggestions or hypotheses, but have no value to meteorology until they have been tested, and their truth demonstrated by a proper course of experimentation. Of course such experiments, even if they consist in simply reading a thermometer or rain gage, require time, money, labor, and especially thought. It is much more difficult to establish a new principle than to merely make a series of observations. One must search out every source of error and every chance of mistaken logic; he must even refute other explanations before he is entitled to say that his own is the correct one. All this is the work of the experiment station, whether it be in the field of agriculture or meteorology.

Investigation along new lines of work is, we suppose, especially characteristic of schools of graduate study. Those who have gone through the ordinary scientific school, having attained the degree of bachelor of science, or perhaps even master of science, and thereby shown an extensive knowledge of what is recognized as correct in science, often wish to pursue a further graduate course, and aim for the degree of doctor of philosophy or doctor of science. These degrees are generally attainable in three or four years and should be a guarantee as to the candidate's ability in original research, an assurance that can only be based upon his having actually performed one or more pieces of thoroughly good work in research. For many years past the colleges at the Capital have enjoyed the proud satisfaction of being able to announce in their circulars that by the Act of Congress of April 12, 1892, students are entitled to the use of the libraries and other facilities offered by Government museums and laboratories. These privileges, however important and highly valued, are, however, as nothing compared with the opportunities that ought to be provided for students as such. College laboratories, observatories, and museums must be provided with apparatus and specimens adapted to student use, and the pedagogical business must be the first consideration. It is only when an advanced student actually enters the Government employment and has his daily work assigned him in the museums, laboratories, libraries, observatories, and workshops in Washington that he can truly profit by his opportunities while at the same time pursuing his studies at some one of the universities too numerous to mention in that city.

So great has been the need of good men in the service of the Department of Agriculture, and so difficult is it to meet this need that many have regarded the establishment of a national university at Washington as a necessary future outcome of the present condition of affairs. We have before expressed our opinion that when graduates from scientific schools or land-grant colleges or agricultural colleges or employees of Government experiment stations throughout the land wish to come to Washington to pursue further studies, they can be entered as student assistants in the respective bureaus and do the work necessary to the degree of doctor of philosophy, under a supervisory committee that shall constitute all the organization that the Government need recognize as its university. From this point of view, we are interested in quoting from the above-mentioned editorial in the Experiment Station Record, as follows:

> The committee on graduate study at Washington reported [to the convention] that no progress had been made in securing a bureau in Washington for the administration of graduate work since the last convention. The committee was directed to exhaust every effort to devise a plan whereby graduate study and research in the several departments of the Government may be efficiently organized and directed under Government control, and in the meantime to secure, if practicable, the same opportunities for study and research in other departments of the Government as are at present afforded graduate students in the Department of Agriculture. A resolution was also adopted by the association recording its appreciation of the action of the Government in making available the facilities for research and advanced work in the Department of Agriculture and expressing a desire that these facilities be still further extended and that a national university devoted exclusively to advanced and graduate research be established.

It is evident that such an arrangement would be of the highest advantage to Government work and to the nation. It will not in the least interfere with, but rather stimulate, the State and local colleges if only their holders of the doctor of philosophy degree be admitted to such school.

A paper on agricultural college libraries, by Miss Clark, librarian of the Department of Agriculture, emphasized the great importance of libraries as aids to the work of investigation and instruction. Arrangements are in progress for assisting agricultural colleges in classifying and cataloguing their libraries; only a small proportion are considered to be well organized and administered. The Library of the Department of Agriculture would be able to keep up an index of agricultural literature if an appropriation of at least $2,500 could be secured for the purpose.

The special index to meteorological literature, of which four parts were published by the Signal Office, is not now being kept up by the Weather Bureau. But the great Lehrbuch, or Treatise on Meteorology, just published by Prof. Julius Hann, shows that he must have a very complete index of his own, and his treatise is, therefore, exceedingly useful as a guide to the literature of any branch of the subject.

It was announced that a graduate summer school of agriculture would hold its first session at Columbus, Ohio, during the summer of 1902. Dr. A. C. True, Director of the Office of Experiment Stations, will act as dean of the school, and if the first session proves a success, it will be continued hereafter under the management of a committee of control appointed by the Association of American Agricultural Colleges and Experiment Stations. It will be essentially a school to stimulate and educate those who desire to engage in research. It seems to be generally admitted that there should be some rational combination of the two different subjects, namely, teaching and investigation, in both the colleges and the stations.

A lively discussion followed Mr. W. V. Thompson's paper on the official relation of agricultural colleges and the proposed national university. He believed that this relation should be one of sympathy and cooperation only.

We repeat that by admitting to the privileges of the departments in Washington only holders of the degree of doctor of philosophy or doctor of science—degrees that are obtained by good work in original research—the Government will at once stimulate the colleges and the students and better assure the future progress of science. The progress of arts, navigation, agriculture, meteorology, and every feature of modern civilization depends upon the steady prosecution of research.—*C. A.*

INTERNATIONAL METEOROLOGICAL COMMITTEE.

The Secretary, H. H. Hildebrandsson announces that as a result of a recent ballot the international meteorological committee has decided to meet during the second week of September, 1903, in the city where the British association will hold its sessions.—*H. H. K.*

THE VARIATION OF THE DIURNAL RANGE OF TEMPERATURE WITH THE LATITUDE AND LOCALITY.

A correspondent makes the following inquiry regarding the diurnal range or amplitude of the temperature at different parts of the earth, in the surface layers of the atmosphere:

"On page 37 of Waldo's Elementary Meteorology the following paragraph occurs: 'The amplitude or regular oscillation of the diurnal temperature (or the difference between the extreme maximum and minimum during the twenty-four hours) is, in general, greatest at the equatorial regions and decreases toward the poles, *for the same exposure*.' I have been unable to reconcile the above statement with the general belief in this section [Missouri] that the temperature of the equatorial regions is more nearly constant, and that the maximum temperatures are lower than the maximum temperatures of this latitude during the summer, and the minimum temperatures are higher than the minimum temperatures for this latitude. If this is true, the amplitude of the equatorial regions would appear to be less than for this latitude. An authoritative statement covering the above point is requested."

The above quoted sentence from Waldo is rather vague. Undoubtedly the author had in mind the *average amplitude* of the diurnal temperature oscillation. This is quite different from the *extreme amplitude* which our correspondent evidently has in mind, and which at certain seasons of the year may be greater in Missouri than in the Tropics. The following remarks relate to the average amplitude:

This subject is explained fully in Dr. J. Hann's new Handbook of Meteorology, pages 56–68, and from it the data of this note are extracted. The general law is that the amplitude diminishes from the Tropics to the polar regions, where it disappears, and from the surface of the earth upward, where the diurnal change of temperature vanishes at altitudes of 2,000 or 3,000 meters in the Tropics, and at less altitudes in high latitudes. All comparisons must be divided into two classes, (1) those over the ocean areas, and (2) those over the land areas. The chief cause of difference between these is the greater conductivity of the ground to solar insolation than that of the water, by which the land absorbs heat more rapidly during the day, and cools more quickly during the night, so that the variation of temperature is greater in the ground. This produces a wider amplitude in the temperature of the layers of air in contact with the surface of the land, than is the case with those which touch upon the surface of the ocean. It will not do to compare land amplitudes with ocean amplitudes in the same or in different latitudes, but these two classes of data must be kept entirely separate. The following examples show the range of the amplitude over the ocean in degrees centigrade:

Diurnal amplitude of temperature over the ocean.

	Latitude.	Air or water.	Departure from normal.		Amplitude.
			4 a. m.	2 p. m.	
			°C.	°C.	°C.
Equatorial regions, Atlantic Ocean	0°–10° N.	Water.	−0.31	+0.36	0.67
		Air.	−0.70	+0.81	1.51
North Atlantic Ocean	30° N.	Air.			1.80
South Atlantic Ocean	36° S.	Air.			1.40
North Pacific Ocean	37° N.	Air.			1.70
South Pacific Ocean	36° S.	Air.			2.20
Pacific Ocean (in higher latitudes)		Air.			0.65
North Atlantic Ocean	30° N.	Water.			0.50
Do		Air.			1.70
European North Sea	63–73° N.	Water.			0.37
Do		Air.			0.82

The following examples show the amplitudes over the land areas:

Amplitude in middle Europe.—January, 3.4; February, 4.7; March, 6.6; April, 8.3; May, 8.9; June, 8.5; July, 8.8; August, 8.5; September, 8.3; October, 6.0; November, 3.7; December, 2.8.

Amplitude in northern India.—January, 13.4; February, 14.1; March, 14.8; April, 14.7; May, 12.3; June, 7.9; July, 5.1; August, 4.9; September, 6.9; October, 11.1; November, 13.4; December, 13.5.

Variation of the amplitude in latitude.

Stations.	Latitude.	Amplitude.
	°	°C.
Lady Franklin Bay	81.7	1.4
Ssagastyr	73.4	2.3
Fort Rae	62.6	5.3
Katharinenburg and Bogoslowsk	58.6	6.9
Barnaul	53.3	8.1
Nukuss	42.5	11.8
Lahore	31.6	12.4
Allahabad and Lucknow	26.2	12.1
Nagpur and Jubbulpur	22.1	11.7

In extreme cases the diurnal range may amount to 14°, 16°, or even to 30° centigrade.

Amplitude on mountains and in high valleys for summer months.

Stations.	Height.	Amplitude.
	Meters.	°C.
Chaumont	1130	6.0
b. Gais	1150	2.9
Rigikulm	1790	2.7
Obirgipfel	2140	3.8
Sonnblickgipfel	3106	2.0
Mont Blanc	4359	3.5
Schuls (valley)	1240	9.5
Reckingen (valley)	1350	10.9
Bevers (valley)	1710	10.1

A cloudy atmosphere diminishes the amplitude by a very large amount.

It is seen that the amplitude diminishes with the latitude, and with the altitude; also that the presence of water in large bodies lessens the variation of the diurnal range, and that valleys have a larger amplitude than do the elevated portions of the surface of the earth. As a rule, when the locality, either in its topography, location or constitution, favors the rapid accumulation of heat during the day by its conductivity, and for the same reason quickly gives up its heat at night, there will be a large amplitude. In the polar regions the twenty-four hours are irregularly divided, being all daylight in summer and all darkness in winter, so that there is no contrast in relation to the sun's diurnal radiation, and therefore the amplitude is very small; in the Tropics the day is much more evenly divided, and the resulting effect is greater accession of heat by day and loss by night, with a wide range in amplitude, especially over the land.—*F. H. B.*

THE "SNOW COUNTRY" OF CENTRAL NEW YORK.

In the MONTHLY WEATHER REVIEW for December, 1901, p. 563, there is an article on "The Influence of small lakes on local climate," having especial reference to the lakes of central and western New York. The heavy snowfall in this section of New York was partly explained in the MONTHLY WEATHER REVIEW for September, 1901, p. 422. Dr. M. A. Veeder communicates the following additional information relative to this subject:

In Oneida County, N. Y., along the line of the Utica and Black River Railroad, between Renisen and Boonville, there is a region popularly known as "Snow Country." It is situated at the parting of the streams, and quite abruptly reaches an elevation of from 1,200 to 1,500 feet above sea level, being the highest land near Lake Ontario. The great amount of snow appears to be due to the fact that the winds that sweep across the lake are forced to a higher level by this elevated land surface. It seems to be a well defined local peculiarity.—*H. H. K.*

NATIONAL BUREAU OF STANDARDS.

The following is a brief abstract of a circular of information issued by the National Bureau of Standards.—*C. F. M.*

The Bureau was established by an Act of Congress, approved March 3, 1901, by virtue of which the old Office of Standard Weights and Measures of the Treasury Department was superseded by the National Bureau, with greatly enlarged powers and duties. Generous provision was made for the purchase of a site for buildings removed from mechanical and electrical disturbances likely to interfere with the delicate work of the Bureau. The laboratory and power house are being planned with a view to future enlargement, and it is expected they will be ready for occupancy by January 1, 1903.

The functions of the Bureau are embraced in three heads, as follows:

(1) The comparison with authorized standards and the testing and calibration of all classes of measuring apparatus employed in science, engineering, manufacture, commerce, the arts, and education.

(2) The construction of standards, their multiples and submultiples, and the solution of problems which arise in connection with standards.

(3) The determination of physical constants and the properties of materials when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere.

Pending the completion of the new laboratories, the Bureau now occupies the old Office of Standard Weights and Measures, and is prepared to take up only a limited amount and kind of work, consisting of the comparison of the standard and measuring instruments named below:

Length measures.—Standard bars from 1 to 10 feet, or from 1 decimeter to 5 meters; base bars; bench standards; leveling rods; graduated scales; engineers' and surveyors' metal tapes 1 to 300 feet, or from 1 to 100 meters.

Weights.—From 0.01 grain to 50 pounds, or from 0.1 milligram to 20 kilograms.

Capacity measures.—From 1 fluid ounce to 5 gallons, or from 1 milliliter to 10 liters.

Thermometers.—Between 32° and 120° Fahrenheit, or 0° to 50° centigrade.

Polariscopic apparatus.—Scales of polariscopes, quartz control plates, and other accessory apparatus.

Hydrometers.—Alcoholometers, salinometers, and saccharometers, whose scales correspond to densities between 0.85 and 1.20.

Resistances.—Standard coils of the following denominations: 1, 2, 5, 10, 100, 1,000, 10,000, 100,000 ohms; low-resistance standards for current measurements of the following denominations: 0.1, 0.01, 0.001, 0.0001 ohms. Coils of resistance boxes; potentiometers; ratio coils.

Standards of electro-motive force.—Clark and other standard cells.

Direct-current measuring apparatus.—Millivoltmeters and voltmeters up to 150 volts; ammeters up to 50 amperes.

It is the desire of the Bureau to cooperate with manufacturers, scientists, and others, in bringing about more satisfactory conditions relative to weights and measures in the broader meaning of the term, and to place at the disposal of those interested such information relative to these subjects as may be in possession of the Bureau. All communications and articles should be addressed "National Bureau of Standards, Washington, D. C."

THE WEATHER OF THE MONTH.

By Prof. ALFRED J. HENRY, in charge of Division of Records and Meteorological Data.

CHARACTERISTICS OF THE WEATHER FOR MARCH.

The weather of February, 1902, was characterized by low temperatures and great dryness in the interior of the country and heavy precipitation on both coasts. The weather of March, 1902, as regards temperature, stands out in strong contrast to that of the preceding month. The temperature was above the seasonal average in all parts of the country, except the middle Rocky Mountain region and thence westward to the coast. The weather in the Lake region was unusually open and pleasant, and gave promise of a speedy opening of interlake navigation. The precipitation was generally above the seasonal average, except in the Ohio Valley and the Lake region. A notable characteristic of the month was the persistence of southwestern storms and the heavy snowfall along the Appalachians from eastern Tennessee to New England.

PRESSURE.

The distribution of monthly mean pressure is shown graphically on Chart IV and the numerical values are given in Tables I and VI.

There was a sharp reaction from the pressure conditions which prevailed in February, 1902. It may be remembered that pressure was unusually low off both coasts and high in the interior. During the current month there was a sharp rise of pressure on both coasts and a fall in the interior, the rise amounting to 0.3 inch over the Canadian Maritime Provinces and about 0.15 inch along the north Pacific coast. Pressure was lower in the interior of the country by amounts ranging on the average from one to two-tenths of an inch. Monthly mean pressure was generally below the average in all parts of the country, except the Canadian Maritime Provinces and the California coast.

TEMPERATURE OF THE AIR.

The distribution of monthly mean surface temperature, as deduced from the records of about 1,000 stations, is shown on Chart VI.

As stated under characteristics of the weather, the month was unusually warm in all districts, except the middle Rocky Mountain and Plateau regions and the Pacific coast. The greatest positive departures occurred in the Lake region, where the temperature was as much as 10° to 12° above the seasonal average. No unusual maximum temperatures were recorded.

A rather severe cold wave for the season swept over the country on the 16th, 17th, and 18th. Temperatures as low as 25° below zero were recorded in North Dakota and northern Minnesota. Freezing temperatures were also recorded in the South Atlantic States, but not in Florida or along the immediate Gulf coast.

The average temperature for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	8	39.7	+7.4	+ 6.4	+2.1
Middle Atlantic	12	44.7	+5.3	− 2.0	−0.7
South Atlantic	10	54.5	+0.9	− 9.7	−3.2
Florida Peninsula	8	66.0	+0.5	− 7.7	−2.6
East Gulf	9	58.9	+0.6	− 9.4	−3.1
West Gulf	7	59.7	+1.9	− 3.2	−1.1
Ohio Valley and Tennessee	11	46.7	+2.7	− 7.8	−2.6
Lower Lake	8	39.3	+7.0	+ 1.9	+0.6
Upper Lake	10	34.8	+8.2	+12.4	+4.1
North Dakota	8	27.2	+7.0	+20.0	+6.7
Upper Mississippi Valley	11	41.4	+5.5	+ 4.3	+1.4
Missouri Valley	11	40.5	+5.1	+ 7.8	+2.6
Northern Slope	7	33.6	+1.8	+12.4	+4.1
Middle Slope	6	44.5	+2.4	+ 4.0	+1.3
Southern Slope	6	52.2	+1.5	+ 3.0	+1.0
Southern Plateau	13	44.2	−4.0	− 0.2	−0.1
Middle Plateau	9	35.2	−2.5	+ 5.8	+1.9
Northern Plateau	12	38.3	+0.9	+ 8.8	+2.9
North Pacific	7	43.9	−1.3	+ 3.9	+1.3
Middle Pacific	5	50.4	−1.9	− 0.7	−0.2
South Pacific	4	53.6	−1.9	+ 0.3	+0.1

In Canada.—Prof. R. F. Stupart says:

The mean temperature was higher than average throughout the Dominion, except in the northern parts of British Columbia and Alberta, where it was below. A positive departure of 6° in the central part of the Northwest Territories increased eastward to 14° at Winnipeg, and apparently to a larger amount in the extreme northern parts of Ontario and Quebec. In Ontario, south of the Georgian Bay, in the St. Lawrence Valley, and in the Maritime Provinces the positive departure was from 7° to 10°. At Dawson, Yukon, the mean of the month was −8°, about 12° below average.

PRECIPITATION.

The month, as a whole, was a wet one. In all districts, except the northern Plateau, the precipitation equaled or exceeded 80 per cent of the normal. In New England and the northern slope 159 per cent of the normal was recorded, while in North Dakota 270 per cent of the normal was registered. Monthly amounts exceeding 10 inches were recorded at a number of stations in southwestern Georgia, central Alabama, eastern Tennessee, central and northern Mississippi, and northeastern Louisiana. The rainfall on the Pacific coast was also abundant. Heavy rains also fell on the coast of Maine, the monthly amounts in a few places exceeding 12 inches.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		Inches.	Inches.
New England	8	6.23	159	+2.3	+1.0
Middle Atlantic	12	3.48	90	−0.4	−0.1
South Atlantic	10	3.73	82	− 0.8	−2.7
Florida Peninsula	8	3.66	124	+0.7	+0.3
East Gulf	9	7.47	129	+1.7	+0.3
West Gulf	7	3.21	94	−0.2	−3.0
Ohio Valley and Tennessee	11	4.03	93	−0.3	−3.9
Lower Lake	8	2.29	88	−0.3	−2.7
Upper Lake	10	1.92	95	−0.1	−2.2
North Dakota	8	2.38	270	+1.5	+1.4
Upper Mississippi Valley	11	2.01	118	+0.3	−1.5
Missouri Valley	11	1.81	100	0.0	−0.8
Northern Slope	7	1.35	159	+0.5	−0.2
Middle Slope	6	1.80	138	+0.5	−0.5
Southern Slope	6	2.31	208	+1.2	−0.5
Southern Plateau	13	0.93	100	0.0	−0.9
Middle Plateau	8	1.32	108	+0.1	−0.3
Northern Plateau	12	0.93	61	−0.6	−1.0
North Pacific	7	6.49	118	+1.0	+4.3
Middle Pacific	5	3.72	93	−0.3	+2.2
South Pacific	4	2.67	118	+0.4	+0.4

More than a foot of snow was measured along the Appalachians from eastern Tennessee to the White Mountains in New England. Very little snow, however, fell east of the mountains and in the central valleys. In the mountain districts westward there was a fair amount of snow, except in southern Nevada and in Arizona. At the close of the month there was no snow on the ground, except locally in the mountain districts, in central New York, central Pennsylvania, the mountain districts of West Virginia, and in lower Michigan and North Dakota.

In Canada.—Professor Stupart says:

The precipitation was largely in excess of average in Quebec and the Maritime Provinces, where it was for the most part rain, also in western Manitoba and eastern Assiniboia, where it was for the most part snow. The only pronounced deficiency occurred in Alberta; in other parts of the Dominion, not named above, departures from average were small. At the close of the month the eastern portions of Saskatchewan and Assiniboia and the larger portion of Manitoba were covered with recently fallen snow, which would quickly disappear. Eastern Quebec was still snow covered, as much as 12 inches being reported from Father Point. Elsewhere in the Dominion the ground was bare, and in the more southern districts the frost was out of the ground.

SLEET.

The following are the dates on which sleet fell in the respective States:

Alabama, 2. Arizona, 2, 10, 24, 25. California, 2, 5, 7, 8, 9, 13, 22. Colorado, 13, 20, 24, 25. Connecticut, 5, 7, 8, 11, 14, 17, 19, 27. District of Columbia, 5. Idaho, 1, 2, 8, 9, 13, 14, 19, 23, 27, 28. Illinois, 1, 12, 19, 20, 27, 30. Indiana, 30, 31. Iowa, 10, 11, 15, 20, 24, 30, 31. Maine, 9, 19, 20, 31. Maryland, 4, 5, 6. Massachusetts, 19, 27. Michigan, 1, 8, 30, 31. Minnesota, 20, 26, 27, 28. Mississippi, 4. Missouri, 4, 12, 29, 30. Nebraska, 14, 29, 31. Nevada, 1, 8, 9, 14, 15, 19. New Hampshire, 1, 9, 19, 31. New Jersey, 5, 6, 13, 16, 19, 22, 25, 27, 31. New Mexico, 3, 11. New York, 13, 19, 20. North Carolina, 2, 4, 5, 17. North Dakota, 14, 15, 30, 31. Ohio, 1, 30, 31. Oregon, 1, 12, 13, 15, 21. Pennsylvania, 2, 5, 13, 14, 30, 31. South Dakota, 6, 14, 15, 21, 25, 28, 29, 30. Tennessee, 1, 2, 4, 5. Texas, 4. Utah, 9, 13, 14, 18, 19, 23, 24. Vermont, 17. Virginia, 4, 5, 15. Washington, 3, 6, 12, 13, 14, 15, 17, 21, 26. West Virginia, 3, 4, 15. Wisconsin, 1, 20, 30. Wyoming, 1, 21.

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 1, 2, 4, 15, 21, 28. Arizona, 24, 25. California, 1, 2, 5, 6, 8, 9, 13, 14, 19, 20, 22, 23, 24, 25. Colorado, 23. Delaware 2, 4. Florida, 1. Georgia, 1, 2, 12, 15, 21, 29. Illinois, 12, 14, 15, 16, 26, 27, 29, 30. Indiana, 12, 15, 29, 30, 31. Indian Territory, 29. Iowa, 15, 28. Kansas, 25. Kentucky, 12, 15, 16, 30. Louisiana, 1, 14, 20, 25, 27, 28. Maryland, 4, 5, 13, 17, 30. Mississippi, 1, 14, 15, 16, 21, 23, 26, 27, 28. Nebraska, 10, 11, 14, 24, 25, 26, 27. Nevada, 20. New York, 5, 13, 20, 30, 31. Ohio, 12, 29, 30, 31. Oklahoma, 20, 25, 26, 28, 29. Oregon, 2, 3, 4, 6, 7, 8, 9, 12, 13, 14, 15, 17, 18, 20, 21, 22, 23, 25, 27. Pennsylvania, 1, 5, 12, 29, 30. South Carolina, 1, 16, 29. South Dakota, 25, 30. Tennessee, 8, 12, 28. Texas, 11, 17, 20, 21, 23, 25, 27, 28, 29. Utah, 2, 3, 6, 9, 11, 19, 21, 23, 24, 26, 27, 29. Virginia, 30. Washington, 1, 2, 4, 8, 12, 13, 14, 15, 17, 18, 19, 20, 21, 25, 27 West Virginia, 2, 12, 13, 30, 31.

HUMIDITY.

The average by districts appear in the subjoined table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	80	+ 5	Missouri Valley	69	− 3
Middle Atlantic	74	+ 3	Northern Slope	68	+ 2
South Atlantic	75	+ 1	Middle Slope	60	0
Florida Peninsula	78	0	Southern Slope	47	− 9
East Gulf	74	0	Southern Plateau	42	+ 2
West Gulf	68	− 2	Middle Plateau	59	+ 5
Ohio Valley and Tennessee	71	+ 1	Northern Plateau	66	− 4
Lower Lake	76	0	North Pacific	78	− 2
Upper Lake	77	− 1	Middle Pacific	72	− 4
North Dakota	80	+ 3	South Pacific	70	− 4
Upper Mississippi Valley	74	+ 3			

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

The averages for the various districts, with departures from the normal, are shown in the table below:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	6.3	+ 0.7	Missouri Valley	5.6	0.0
Middle Atlantic	5.6	+ 0.1	Northern Slope	5.6	+ 0.3
South Atlantic	4.9	+ 0.2	Middle Slope	4.7	+ 0.3
Florida Peninsula	4.1	+ 0.1	Southern Slope	4.2	0.0
East Gulf	5.6	+ 0.9	Southern Plateau	3.3	+ 0.3
West Gulf	4.7	− 0.5	Middle Plateau	5.4	+ 0.5
Ohio Valley and Tennessee	6.1	+ 0.2	Northern Plateau	6.8	+ 0.3
Lower Lake	6.3	− 0.1	North Pacific	7.6	+ 1.0
Upper Lake	5.9	0.0	Middle Pacific	4.3	− 0.7
North Dakota	6.3	+ 0.8	South Pacific	4.0	− 0.5
Upper Mississippi Valley	6.4	+ 0.9			

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IV, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 2,035 thunderstorms were received during the current month as against 1,596 in 1901 and 975 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 30th, 213; 12th, 179; 28th, 172.

Reports were most numerous from: Missouri, 153; Nebraska, 126; Mississippi, 110.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz: 19th to 27th.

In Canada: Thunderstorms were reported at Quebec, 2d, Toronto, 11th; Port Stanley, 1st, 13th; Parry Sound, 11th; Hamilton, Bermuda, 3d, 18th, 31st; Port Simpson, 26th. Auroras were reported as follows: Father Point, 24th; Port Arthur, 12th; Minnedosa, 12th; Swift Current, 31st; Prince Albert 10th.

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Amarillo, Tex	4	51	nw.	Mount Tamalpais, Cal	23	50	nw.
Do	11	55	ne.	Do	24	50	nw.
Do	15	50	sw.	Do	25	72	nw.
Do	23	50	se.	Do	31	53	sw.
Do	25	51	sw.	New York, N. Y	5	50	ne.
Block Island, R. I	5	60	ne.	Do	13	51	nw.
Do	19	72	ne.	Do	18	52	nw.
Buffalo, N. Y	12	52	sw.	Do	19	74	nw.
Do	17	52	w.	Point Reyes Light, Cal	2	75	nw.
Cape Henry, Va	19	57	nw.	Do	5	92	sw.
Carson City, Nev	2	64	sw.	Do	7	60	sw.
Do	13	50	w.	Do	8	68	sw.
Chicago, Ill	16	57	w.	Do	9	66	nw.
Cleveland, Ohio	30	56	sw.	Do	10	66	nw.
Denver, Colo	15	54	nw.	Do	12	74	nw.
El Paso, Tex	3	54	w.	Do	13	72	nw.
Do	6	55	sw.	Do	14	60	nw.
Do	14	57	sw.	Do	15	58	nw.
Do	29	50	w.	Do	19	66	nw.
Fort Worth, Tex	11	52	s.	Do	20	60	nw.
Huron, S. Dak	16	55	nw.	Do	21	68	nw.
Independence, Cal	13	56	w.	Do	22	60	nw.
Lexington, Ky	30	55	w.	Do	23	50	nw.
Minneapolis, Minn	15	50	s.	Do	24	55	nw.
Mount Tamalpais, Cal	1	71	sw.	Do	25	62	nw.
Do	2	58	sw.	Sacramento, Cal	2	62	s.
Do	8	51	sw.	Sioux City, Iowa	14	52	s.
Do	13	80	nw.	Do	16	58	nw.
Do	14	55	nw.	Do	30	51	nw.
Do	15	55	nw.	Williston, N. Dak	16	60	n.
Do	18	56	nw.	Winnemucca, Nev	2	60	sw.
Do	21	52	nw.	Do	6	50	sw.

DESCRIPTION OF TABLES AND CHARTS.

By ALFRED J. HENRY, Professor of Meteorology.

For description of tables and charts see page 570 of REVIEW for December, 1901.

TABLE I.—*Climatological data for Weather Bureau Stations, March, 1902.*

Stations.	Elevation of instruments. Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Temperature of the air, in degrees Fahrenheit. Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches. Total.	Departure from normal.	Days with .01, or more.	Wind. Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Direction.	Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
New England.							39.7	+ 7.4										80	6.23	+ 2.3										6.3	
Eastport	76	69	74	29.84	29.93	.00	36.4	+ 7.7	54	13	42	14	7	31	24	34	31	83	9.11	+ 4.7	19	11,160	n.	48	e.	19	5	7	19	7.7	16.0
Portland, Me.	103	81	117	29.78	29.92	— .04	39.6	+ 7.6	67	13	46	21	7	33	32	35	31	77	8.76	+ 5.4	17	8,606	n.	44	s.	2	8	7	16	6.6	7.4
Northfield	876	15	65	28.99	29.96	— .04	34.2	+ 9.2	60	28	44	5	7	25	39	32	29	85	4.97	+ 2.1	16	7,846	n.	38	n.	19	5	7	19	7.0	14.2
Boston	125	115	181	29.79	29.93	— .04	43.4	+ 9.2	69	12	50	26	18	36	27	39	34	74	5.29	+ 1.2	13	9,794	sw.	44	ne.	19	11	7	13	5.6	7.5
Nantucket	12	43	85	29.92	29.93	— .05	40.4	+ 5.5	57	30	45	26	19	36	19	38	36	85	4.55	+ 1.0	15	12,911	nw.	48	n.	14	6	12	13	6.7	8.0
Block Island	26	11	70	29.91	29.94	— .04	40.4	+ 5.6	56	30	45	26	19	36	15	37	34	82	6.33	+ 2.3	13	13,952	sw.	72	ne.	19	9	10	12	5.7	4.4
Narragansett		10					40.4	+ 7.1	59	30	47	22	7	34	21				6.18	+ 1.6	11		s.				11	8	12	...	5.5
New Haven	106	117	140	29.83	29.95	— .04	42.0	+ 7.4	65	22	49	22	7	35	24	37	33	76	4.63	+ 0.4	13	8,505	n.	45	ne.	5	15	6	10	4.6	7.5
Mid. Atlantic States.							44.7	+ 5.3										74	3.48	— 0.4										5.6	
Albany	97	102	115	29.86	29.97	— .04	39.6	+ 7.7	62	29	47	20	7	32	25	36	32	78	3.24	+ 0.6	16	7,480	nw.	34	se.	29	9	9	13	6.1	9.1
Binghamton	875	79	90	29.03	29.98	— .04	38.4	+ 7.6	67	29	46	15	18	30	31				3.54	+ 0.4	14	6,289	nw.	30	n.	19	7	7	17	6.9	14.2
New York	314	108	350	29.61	29.96	— .04	44.0	+ 7.1	65	12	51	21	19	37	24	39	33	70	4.32	+ 0.3	14	13,532	nw.	74	nw.	19	10	7	14	5.6	6.8
Harrisburg	374	94	104	29.60	30.00	— .03	43.3	+ 7.1	70	29	52	16	19	35	25				2.98	— 0.5	10	7,569	nw.	38	nw.	13	9	10	12	5.5	13.0
Philadelphia	117	168	184	29.86	29.99	— .03	46.2	+ 7.1	74	29	55	20	19	38	25	41	36	72	3.97	+ 0.7	13	9,706	nw.	42	nw.	19	11	11	9	5.4	4.2
Scranton	805	111	119	29.11	29.99	— .03	40.8		69	12	49	17	19	33	30	36	30	71	3.14		13	6,790	n.	35	w.	13	5	9	17	6.6	14.6
Atlantic City	52	39	48	29.93	29.99	— .03	42.0	+ 4.4	59	13	48	20	19	36	21	39	36	82	4.26	+ 0.3	12	7,889	nw.	40	s.	16	8	16	7	5.3	0.2
Cape May	17	47	51	29.99	30.01	.00	42.5	+ 3.0	58	29	48	22	19	37	17	39			3.87	— 0.5	12	7,944	nw.	43	s.	16	7	18	6	5.3	T.
Baltimore	123	68	82	29.86	29.99	— .04	46.7	+ 5.2	77	29	55	20	19	38	26	42	38	78	3.41	— 0.7	11	4,594	w.	27	sw.	13	10	11	10	5.5	5.0
Washington	112	59	76	29.88	30.01	— .03	46.7	+ 5.4	78	29	56	18	19	37	34	41	36	73	3.78	— 0.4	11	7,365	nw.	40	nw.	19	11	14	6	4.8	4.0
Cape Henry		5	58				48.3	+ 3.1	76	13	57	22	19	40	29				1.83	— 3.3	10	11,406	s.	57	nw.	19	3	17	11	6.4	
Lynchburg	681	83	88	29.26	30.01	— .04	48.0	+ 2.8	77	29	58	21	19	38	36	41	34	64	4.09	+ 0.4	8	4,923	nw.	34	nw.	31	12	9	10	5.2	0.1
Norfolk	91	102	111	29.92	30.01	— .02	50.4	+ 3.5	76	30	59	22	19	42	27	45	42	78	2.44	— 2.2	8	8,890	s.	42	nw.	19	13	9	9	4.7	T.
Richmond	144	82	90	29.86	30.02	— .02	50.0		76	29	60	19	19	40	33				1.89		10	5,541	nw.	30	sw.	31	8	10	13	5.5	
S. Atlantic States.							54.5	+ 0.9										75	3.73	— 0.8										4.9	
Charlotte	773	68	76	29.19	30.03	— .02	51.7	+ 1.8	75	30	61	21	19	42	33	45	39	68	3.54	— 1.2	13	6,215	sw.	38	w.	31	10	11	10	5.5	
Hatteras	11	18	47	30.00			50.7	+ 0.6	72	29	57	25	19	44	21	47	45	86	2.78	— 3.3	11	11,256	sw.	46	ne.	18	17	7	7	4.2	
Kittyhawk	8	12	30				48.6	+ 1.2	74	13	56	26	19	42	26				1.86	— 3.3	5	11,454	ne.				13	10	8	4.8	
Raleigh	376	93	101	29.62	30.03	— .02	51.0	+ 2.8	78	30	61	20	19	41	33	46	41	73	2.14	— 1.9	14	5,839	nw.	32	sw.	30	12	8	11	5.2	0.3
Wilmington	78	82	90	29.96	30.05	.00	54.7	+ 0.8	80	30	64	24	19	46	27	48	43	73	3.61	— 0.3	13	7,857	s.	36	nw.	31	12	10	9	4.8	T.
Charleston	48	14	92	30.00	30.05	— .01	57.3	+ 0.6	81	30	65	30	19	50	23	51	47	77	4.36	+ 0.4	7	8,778	nw.	42	s.	29	12	11	8	4.7	
Columbia	351	114	122	29.66	30.05	— .01	54.6	+ 0.4	79	30	64	25	19	45	33	48	43	71	4.16	— 0.4	11	7,510	se.	41	sw.	30	9	12	10	5.5	
Augusta	180	89	103	29.84	30.04	— .02	55.4	— 0.1	79	30	65	29	19	46	35	49	45	74	5.40	+ 0.2	12	5,839	nw.	32	nw.	31	13	7	11	4.7	
Savannah	65	79	89	29.98	30.05	— .01	58.6	+ 0.1	83	30	67	34	19	51	24	52	49	77	5.22	+ 1.4	13	7,022	sw.	34	nw.	5	12	13	6	4.7	
Jacksonville	43	69	84	29.99	30.04	— .02	62.4	+ 0.4	83	30	71	37	6	54	28	55	51	74	4.20	+ 0.8	14	6,537	se.	32	w.	2	11	12	8	4.6	
Florida Peninsula.							69.5	+ 0.8										78	1.03	— 1.3										4.1	
Jupiter	28	10	30	30.02	30.05	.00	69.6	+ 1.8	88	30	76	40	6	63	23	64	61	79	0.97	— 2.0	7	10,558	s.	36	w.	5	15	16	0	4.0	
Key West	22	43	50	30.01	30.02	— .03	72.6	— 0.1	83	30	77	53	6	68	15	67	64	79	0.22	— 1.0	3	8,080	se.	36	nw.	5	22	6	3	3.3	
Tampa	34	60	67	30.01	30.05	— .02	66.2	+ 0.7	81	28	75	41	19	58	28	60	56	77	1.91	— 0.9	6	6,338	ne.	33	s.	1	9	14	8	5.0	
East Gulf States.							58.9	+ 0.6										74	7.47	+ 1.7										5.6	
Atlanta	1,174	190	216	28.79	30.04	— .02	51.1	— 0.4	72	10	50	20	18	43	31	44	38	69	6.49	+ 0.7	16	11,560	nw.	48	nw.	5	10	8	13	5.9	
Macon	370	93	99	29.64	30.04	— .02	55.4		77	29	65	26	19	46	35				7.65		14	5,978	nw.	32	s.	29	9	8	14	6.0	
Pensacola	56	78	96	29.96	30.02	— .04	61.0	+ 1.5	79	30	67	36	6	55	20				8.06	+ 2.6	12	8,948	n.	38	se.	12	12	5	14	5.6	
Mobile	57	88	96	29.96	30.02	— .04	60.3	+ 1.4	79	24	67	35	6	53	23	55	51	79	6.52	— 1.0	14	7,251	se.	30	n.	4	11	6	14	5.8	
Montgomery	223	100	112	29.78	30.02	— .04	57.3	+ 0.3	77	11	66	30	18	49	29	52	49	80	8.60	+ 2.1	15	6,523	e.	42	sw.	1	11	9	11	5.3	
Meridian	375	84	93	29.60	30.01	— .04	56.5	— 0.9	79	12	66	27	6	47	39				9.90	+ 4.4	15	5,847	n.	38	e.	27	9	12	10	5.5	
Vicksburg	247	62	74	29.71	29.98	— .06	58.7	+ 0.7	78	25	68	34	18	50	33	51	44	66	12.26	+ 5.8	9	7,218	se.	38	sw.	12	11	9	11	5.5	
New Orleans	51	88	121	29.93	29.99	— .05	63.4	+ 1.4	84	24	71	38	6	56	26	57	52	74	4.07	— 1.2	8	8,597	se.	38	s.	28	12	10	9	5.2	
Port Eads		27					62.8	+ 0.6	77	*	70	43	*	56	25				3.87	+ 0.1	18		ne.				6	8	17	...	
West Gulf States.							59.7	+ 1.9										68	3.21	— 0.2										4.7	
Shreveport	249	77	84	29.70	29.97	— .05	58.1	+ 0.5	84	26	67	33	18	49	33	53	49	76	7.88	+ 3.2	10	6,676	se.	33	s.	11	12	10	9	5.2	
Fort Smith	457	79	94	29.46	29.95	— .06	53.0	+ 3.0	76	9	62	25	18	44	33	44	35	58	5.19	+ 1.9	9	9,072	e.	46	nw.	30	6	21	4	4.7	
Little Rock	357	93	100	29.59	29.97	— .06	54.2	+ 2.0	76	29	63	26	18	46	32	47	40	64	4.90	— 0.3	9	7,183	se.	37	nw.	12	11	11	9	5.0	
Corpus Christi	20	48	53	29.93	29.94	— .04	66.4	+ 3.6	85	29	72	44	5	60	26	59	54	73	0.18	— 1.5	8	9,235	se.	36	nw.	4	15	12	4	3.6	
Fort Worth	670	106	114	29.24	29.95	— .03	57.8		94	3	69	31	5	47	42				3.80		5	10,168	nw.	52	s.	11	18	8	5	3.6	
Galveston	54	106	112	29.89	29.94	— .07	62.2	— 0.3	77	28	67	41	5	58	20	57	53	79	0.92	— 2.0	7	10,067	se.	40	nw.	4	10	9	12	5.6	
Palestine	510	73	79	29.44	29.97	— .03	59.4	+ 1.8	83	29	69	32	5	50	30	53	48	75	3.31	— 0.7	7	7,764	n.	36	n.	4	13	7	11	5.0	
San Antonio	701	80	91	29.21	29.94	— .04	64.4	+ 2.5	87	3	76	37	6	53	39	52	40	49	0.12	— 1.9	2	7,211	se.	43	nw.	4	11	14	6	4.8	
Taylor	583	55	63	29.34	29.96	— .03	60.6		87	3	73	30	6	48	36				0.72		5	8,708	n.	40	n.	4	13	6	12	5.0	
Ohio Val. and Tenn.							46.7	+ 2.7										71	4.03	— 0.3										6.1	
Chattanooga	762	106	112	29.22	30.06	.00	50.4	— 0.1	75	25	60	17	18	41	31	45	40	73	5.16	— 0.8	15	6,759	se.	43	w.	28	10	10	11	5.8	0.5
Knoxville	1,004	10	88	28.96	30.01	— .05	48.8	+ 1.2	75	25	58	15	18	39	34	43	38	73	6.37	+ 1.0	14	6,326	ne.	42	w.	17	10	8	13	6.1	2.1
Memphis	397	140	154	29.58	30.00	— .04	53.8	+ 2.2	74	10	62	26	18	46	29	47	42	69	5.96	+ 0.1	10	9,421	nw.	45	nw.	2	10	8	13	5.5	0.5
Nashville	546	122	131	29.44	30.04	— .01	50.1	+ 1.4	74	11	59	17	18	41	29	44	38	68	6.96	+ 1.8	12	6,882	nw.	48	s.	26	10	8	13	6.1	2.4
Lexington	989	75	102	28.92	29.98	— .07	44.7	+ 2.8	71	11	53	10	18	37	28				2.92	— 2.0	11	10,262	s.	55	w.	30	7	14	10	5.8	10.3
Louisville	525	114	136	29.44	30.04	— .01	46.9	+ 2.5	74	11	55	12	18	38	30	41	36	70	2.10	— 1.9	13	7,693	se.	41	sw.	30	6	11	14	6.5	5.5
Evansville	431	72	82	29.51	29.99	— .05	47.3		75	25	54	13	18	40	25				3.12		15	5,964	se.	38	s.	26	12	10	9	4.9	0.3
Indianapolis	822	154	164	29.10	30.00	— .04	42.9	+ 3.4	69	12	51	10	18	35	29	38	33	73	3.08	— 0.5	12	10,076	se.	47	s.	12	7	11	13	6.3	1.5
Cincinnati	628	152	157	29.33	30.02	— .03	44.8	+ 2.6	72	11	53	11	18	36	30	40	35	69	1.47	— 1.8	15	7,107	se.	39	nw.	31	5	10	16	6.8	3.1
Columbus	824	87	100	29.11	29.99	— .05	42.7	+ 4.6	69	26	52	11	18	34	31	37	31	69	2.63	— 0.4	12	7,454	w.	36	sw.	30	5	10	16	6.9	3.4
Pittsburg	842	116	123	29.07	29.99	— .05	44.2	+ 5.5	74	11	53	12	18	35	29	38	32	68	4.15	+ 1.4	12	5,414	nw.	36	sw.	30	9	9	13	6.1	16.7
Parkersburg	638	77	84	29.34	30.03	— .02	44.6	+ 3.2	75	11	54	12	6	35	35	39	34	74	3.52	— 0.1	14	5,793	w.	40	w.	30	9	8	14	6.0	12.1
Elkins	1,940	41	50	27.93	30.01	— .04	39.7		71	27	51	8	18	28	42	35	31	78	4.39		15	4,510	w.	36	sw.	30	4	12	15	6.8	12.0
Lower Lake Region.							39.3	+ 7.0										76	2.29	— 0.3										6.3	
Buffalo	767	178	206	29.13	29.97	— .05	39.2	+ 9.2	65	12	46	14	19	32	28	35	30	72	1.81	— 0.8	17	10,906	w.	52	sw.	12	5	8	18	7.5	3.2
Oswego	335	76	91	29.59	29.97	— .04	37.4	+ 7.0	65	29	44	14	19	31	24	34	30	77	3.80	+ 1.2	14	9,153	s.	33	n.	13	7	5	19	6.6	2.7
Rochester	523	81	90	29.40	29.99	— .03	39.4	+ 9.1	66	12	46	15	18	32	27	35	31	75	1.48	— 1.4	13	7,284	w.	36	sw.	29	7	13	11	5.8	1.2
Erie	713	92	102	29.19	29.97	— .05	39.2	+ 6.8	70	12	46	13	19	32	26	36	34	85	0.77	— 2.0	12	9,511	w.	37	s.	16	8	7	16	6.6	1.8
Cleveland	762	190	201	29.15	29.99	— .04	39.6	+ 6.1	69	12	46	13	18	33	30	35	31	74	2.34	— 0.4	12	13,261	se.	56	sw.	30	11	3	17	6.0	1.2
Sandusky	629	62	70	29.29	29.98	— .05	40.2	+ 5.5	69	12	47	13	18	34	30				2.67	+ 0.1	12	7,372	sw.	47	nw.	31	7	8	16	6.6	2.4
Toledo	628	123	127	29.29	29.98	— .05	39.8	+ 5.2	69	12	47	11	18	32	33	36	31	75	2.76	+ 0.7	11	9,310	w.	48	w.	30	11	10	10	5.2	1.5
Detroit	730	153	193	29.17	29.97	— .06	39.3	+ 6.8	64	27	47	10	18	32	32	35	31	76	2.66	+ 0.4	14	10,252	sw.	48	w.	30	8	10	13	5.9	1.2
Upper Lake Region.							34.8	+ 8.2										77	1.92	— 0.1										5.9	
Alpena	609	63	80	29.32	30.01	— .02	33.8	+ 9.8	69	27	41	1	18	26	35	30	26	77	1.51	— 0.4	10	8,408	n.	45	s.	16	14	6	11	5.2	1.3
Escanaba	612	43	57	29.30	29.98	— .06	32.2	+10.4	52	29	39	4	17	26	26	29	27	83	0.88	— 0.9	8	6,730	n.	42	s.	16	10	8	13	5.7	0.3
Grand Haven	632	54	92	29.26	29.97	— .06	36.9	+ 6.3	64	10	45	7	17	29	29	33	30	80	3.64	+ 1.4	14	10,134	s.	48	sw.	16	10	7	14	6.0	3.8
Houghton	668	66	74	29.21	29.96	— .08	31.6		61	10	40	— 2	17	23	31				1.47		8	5,190	e.	28	n.	1	10	8	13	5.7	11.0
Marquette	734	79	116	29.16	29.98	— .06	33.3	+10.1	60	27	39	3	17	28	30	29	24	70	0.67	— 1.2	9	8,603	nw.	42	s.	16	8	8	15	6.4	2.5
Port Huron	638	70	120	29.29	30.00	— .03	36.3	+ 7.2	68	27	44	9	18	29	33	33	30	80	2.05	— 0.6	14	10,242	n.	45	w.	30	10	8	13	6.0	0.2
Sault Ste. Marie	614	40	61	29.29	29.98	— .05	32.2	+10.3	54	27	40	— 6	18	24	28	28	24	76	0.95	— 0.3	9	6,449	se.	43	s.	16	15	4	12	4.7	1.7
Chicago	823	241	274	29.08	29.99	— .04	38.6	+ 4.5	65	27	44	3	17	33	25	35	32	80	4.16	+ 1.7	12	13,999	s.	57	w.	16	6	13	12	6.1	2.1
Milwaukee	681	124	142	29.23	29.98	— .05	37.3	+ 6.8	65	27	44	2	17	31	29	33	29	79	1.91	— 0.6	14	8,764	n.	43	sw.	16	6	6	19	6.8	6.9
Green Bay	617	49	57	29.29	29.98	— .06	35.4	+ 8.7	64	27	43	2	17	28	29	31	27	76	2.65	+ 0.5	7	8,275	ne.	38	sw.	16	7	8	16	6.6	4.7
Duluth	702	95	116	29.16	29.94	— .12	31.9	+ 7.9	60	11	38	— 8	17	25	30	28	22	70	0.77	— 0.9	9	9,133	ne.	38	sw.	15	9	12	10	5.8	4.4
North Dakota.							27.9	+ 5.8										80	2.11	+ 1.3										6.3	
Moorhead	935	54	60	28.87	29.91	— .17	32.0	+11.8	57	13	40	—10	17	24	36	29	29	87	2.26	+ 1.4	11	9,173	se.	38	se.	18	8	4	19	6.9	7.2
Bismarck	1,674	16	29	28.10	29.93	— .13	26.4	+ 3.8	56	13	34	—15	17	19	31	23	17	68	2.70	+ 1.6	11	9,543	nw.	48	nw.	16	10	5	16	6.2	15.4
Williston	1,875	15	31	27.90	29.94	— .10	25.4	+ 1.9	49	10	33	—18	17	18	36	23	21	84	1.36	+ 0.9	9	9,616	n.	60	n.	16	12	10	9	5.7	4.6

TABLE I.—*Climatological data for Weather Bureau Stations, March, 1902*—Continued.

Stations.	Elevation of instruments: Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Pressure, in inches: Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Temperature of the air, in degrees Fahrenheit: Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches: Total.	Departure from normal.	Days with .01, or more.	Wind: Total movement, miles.	Prevailing direction.	Maximum velocity: Miles per hour.	Direction.	Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
Upper Miss. Valley.							**41.4**	**+5.5**										**74**	**2.01**	**+0.3**										**6.4**	
Minneapolis	...	99	208	...	...	...	36.2	+8.8	63	26	45	-7	17	27	39	...	...	...	0.30	-1.2	8	10,575	se.	50	s.	15	7	13	11	...	1.5
St. Paul	837	114	124	29.00	29.93	-.12	36.2	+8.7	62	26	44	-6	17	28	36	31	26	71	0.58	-0.8	8	7,364	se.	34	se.	14	7	16	8	5.9	2.1
La Crosse	714	71	87	29.17	29.96	-.08	38.0	+7.2	64	27	46	-4	17	30	30	...	...	...	1.05	-0.5	8	6,629	s.	32	w.	16	2	18	11	6.7	1.0
Davenport	606	71	79	29.29	29.94	-.09	40.2	+5.3	66	26	48	0	17	32	25	35	31	73	1.76	-0.4	8	7,370	w.	38	w.	16	3	12	16	7.0	0.1
Des Moines	861	84	88	29.03	29.97	-.07	40.5	+5.8	71	25	49	2	17	32	32	35	30	72	1.15	-0.3	10	8,646	nw.	40	w.	16	5	20	6	5.8	0.6
Dubuque	698	100	117	29.20	29.97	-.07	39.3	+6.4	65	27	47	-3	17	32	31	34	28	71	1.76	-0.5	10	6,430	se.	28	nw.	17	5	11	15	7.1	1.4
Keokuk	614	63	78	29.28	29.96	-.07	42.2	+4.6	71	25	49	6	17	35	28	37	33	76	2.24	+0.1	10	7,620	se.	38	w.	30	6	11	14	6.1	1.0
Cairo	356	87	93	29.62	30.01	-.03	49.2	+2.4	70	10	57	17	18	41	26	45	41	78	2.12	-1.6	13	8,460	se.	40	sw.	12	6	16	9	5.8	0.7
Springfield, Ill	644	82	93	29.28	29.98	-.05	42.8	+3.6	71	25	50	10	17	36	27	38	34	74	3.73	+1.0	11	8,900	s.	36	w.	16	5	12	14	6.9	0.3
Hannibal	534	75	110	29.37	29.95	-.07	43.8	+4.3	73	26	52	8	17	36	28	...	...	...	2.95	+0.2	9	8,788	nw.	47	nw.	16	6	14	11	6.0	0.4
St. Louis	567	111	210	29.36	29.97	-.06	46.8	+3.7	74	25	54	17	18	40	24	42	38	75	4.50	+1.0	11	7,345	s.	47	sw.	12	8	9	14	6.5	T.
Missouri Valley.							**40.5**	**+5.1**										**69**	**1.81**	**0.0**										**5.6**	
Columbia	784	11	84	29.13	29.98	-.05	44.4	+3.0	74	26	53	12	17	36	35	...	...	...	3.58	+0.6	13	8,420	se.	40	nw.	16	11	2	18	6.3	2.2
Kansas City	963	78	95	28.93	29.98	-.04	44.8	+4.3	72	25	54	10	17	36	30	38	31	64	2.74	+0.6	11	7,480	se.	34	nw.	16	12	6	13	5.4	4.8
Springfield, Mo.	1,324	98	104	28.54	29.96	-.06	45.8	+2.3	73	25	54	17	17	37	31	41	37	75	5.05	+1.3	11	10,355	se.	42	w.	29	16	4	11	4.8	T.
Topeka	...	81	89	...	...	...	45.2	+4.2	74	25	55	10	17	35	34	...	...	...	1.62	-0.5	11	9,282	s.	37	s.	14	6	14	11	5.5	1.7
Lincoln	1,189	75	84	28.62	29.90	-.12	42.5	+4.6	73	25	53	4	17	32	37	35	28	64	0.37	-1.0	8	11,848	se.	49	se.	14	10	12	9	5.0	1.0
Omaha	1,105	115	121	28.72	29.92	-.12	41.8	+6.3	71	25	51	2	17	32	34	35	28	64	0.70	-0.8	8	8,471	se.	37	nw.	30	7	15	9	5.9	0.6
Valentine	2,598	39	40	27.10	29.86	-.17	35.6	+4.4	70	9	47	-12	17	24	40	30	24	70	1.07	-0.4	7	10,582	nw.	49	nw.	16	8	15	8	5.7	1.9
Sioux City	1,135	96	164	28.67	29.91	-.14	38.4	+6.8	70	13	48	-2	17	29	45	...	...	...	0.50	-0.7	12	13,590	nw.	58	nw.	16	8	11	12	5.9	1.5
Pierre	1,572	43	50	28.20	29.90	-.15	35.0	+5.6	70	9	43	-4	17	27	38	30	24	69	1.38	+0.5	11	8,013	n.	46	nw.	26	6	10	15	6.6	10.0
Huron	1,306	56	67	28.48	29.90	-.16	34.4	+6.8	68	13	45	-9	17	24	40	30	26	78	1.56	+0.7	10	11,812	se.	55	nw.	16	8	12	11	5.9	5.4
Yankton	1,233	42	49	28.54	29.89	-.16	37.5	+7.5	71	9	47	-3	17	28	36	...	...	...	1.32	-0.1	9	7,174	nw.	40	se.	14	13	14	4	4.2	4.8
Northern Slope.							**33.6**	**+1.8**										**68**	**1.35**	**+0.5**										**5.6**	
Havre	2,505	46	53	27.23	29.93	-.07	32.6	+3.6	59	8	43	-10	16	22	46	28	23	71	0.09	-0.4	3	8,807	sw.	44	sw.	12	10	14	7	5.4	0.9
Miles City	2,371	42	50	27.35	29.90	-.12	33.4	+2.0	62	8	43	-8	17	24	34	30	27	84	1.15	+0.6	10	5,563	n.	40	nw.	26	9	12	10	5.8	6.8
Helena	4,110	88	94	25.67	29.95	-.06	32.7	+0.1	52	8	40	-7	16	25	35	28	21	62	0.58	0.0	11	5,762	sw.	33	sw.	8	4	13	14	6.3	7.7
Kalispell	2,965	45	51	26.80	29.91	-.08	34.5	...	53	8	43	6	16	26	27	29	24	69	0.46	...	10	4,200	w.	32	nw.	27	7	18	6	5.2	3.1
Rapid City	3,234	46	50	26.45	29.88	-.13	34.4	+3.2	64	9	44	-8	17	24	35	30	24	72	3.34	+2.2	11	7,588	nw.	40	nw.	15	10	12	9	5.5	1.8
Cheyenne	6,088	56	64	23.82	29.91	-.05	31.1	-1.7	58	18	41	7	17	21	41	26	18	61	2.11	+1.4	12	8,799	nw.	46	nw.	16	11	12	8	5.0	14.3
Lander	5,372	26	36	24.49	29.93	-.06	31.0	+0.5	54	18	43	-3	16	19	36	26	19	64	0.77	-0.8	7	3,378	nw.	42	sw.	13	7	15	9	5.6	7.7
North Platte	2,821	43	52	26.94	29.90	-.10	39.8	+4.7	70	13	52	2	17	28	42	32	25	63	1.42	+0.7	2	9,531	nw.	48	nw.	26	8	18	5	5.6	T.
Middle Slope.							**44.5**	**+2.4**										**60**	**1.80**	**+0.5**										**4.7**	
Denver	5,291	79	151	24.56	29.87	-.08	38.0	-0.8	67	18	50	12	30	26	47	30	18	49	0.63	-0.3	6	7,093	n.	54	nw.	15	11	12	8	4.8	5.0
Pueblo	4,685	80	86	25.12	29.84	-.08	39.6	-0.8	69	18	54	9	30	25	51	30	17	46	0.58	+0.1	5	6,704	nw.	50	nw.	25	14	14	3	4.4	4.0
Concordia	1,398	42	47	28.42	29.92	-.09	45.6	+6.6	82	10	56	6	17	35	38	38	32	68	0.30	-1.3	4	8,819	s.	42	s.	25	9	13	9	5.1	T.
Dodge	2,509	44	52	27.28	29.90	-.07	45.4	+3.8	75	10	58	11	17	33	43	36	29	64	1.58	+0.6	5	11,656	nw.	48	s.	6	15	11	5	4.4	4.8
Wichita	1,358	78	85	28.50	29.95	-.04	47.2	+3.7	77	10	57	12	17	38	36	39	30	60	2.79	+0.9	10	9,271	s.	36	s.	15	17	5	9	4.6	3.0
Oklahoma	1,214	54	62	28.64	29.94	-.04	51.0	+1.9	79	10	61	22	5	41	33	44	39	71	4.90	+2.8	7	9,365	s.	40	nw.	12	13	10	8	4.7	
Southern Slope.							**51.4**	**+1.9**										**47**	**1.50**	**+0.7**										**4.2**	
Abilene	1,738	45	54	28.11	29.92	-.04	56.9	+2.8	90	3	68	27	5	45	41	46	34	49	2.25	+1.1	3	9,198	se.	36	se.	6	13	12	6	4.6	
Amarillo	3,676	54	61	26.13	29.88	-.07	45.9	+1.0	75	9	59	18	17	33	43	35	21	45	0.74	+0.3	3	14,964	sw.	55	ne.	11	14	12	5	3.9	T.
Southern Plateau.							**47.0**	**-4.3**										**42**	**0.93**	**0.0**										**3.3**	
El Paso	3,762	10	110	26.09	29.86	-.02	53.7	-2.1	79	2	68	27	5	39	48	38	15	26	0.00	-0.4	0	11,899	nw.	57	sw.	14	18	12	1	2.7	
Santa Fe	7,013	47	50	23.11	29.90	+.01	36.0	-3.5	56	31	46	16	15	26	32	28	18	49	1.13	+0.5	8	6,708	nw.	33	nw.	7	15	13	3	3.5	10.8
Flagstaff	6,907	12	25	23.22	29.88	-.03	31.0	-6.2	57	31	43	-8	26	19	48	26	20	67	2.72	-0.4	11	6,704	sw.	40	sw.	6	14	6	11	5.1	25.9
Phoenix	1,108	50	56	28.77	29.94	+.03	57.4	-4.1	83	17	71	36	26	44	39	43	26	37	0.46	-0.1	4	3,731	e.	26	w.	3	14	11	6	4.1	
Yuma	141	16	50	29.78	29.94	.00	59.4	-4.6	85	31	74	36	25	45	39	46	29	38	0.21	0.0	1	5,714	w.	41	w.	9	25	5	1	1.5	
Independence	3,910	51	58	25.91	29.91	-.03	44.6	-5.1	67	31	56	25	4	34	31	35	16	33	1.05	+0.6	3	8,466	n.	56	w.	13	15	16	0	3.0	
Middle Plateau.							**36.9**	**-4.4**										**59**	**0.84**	**-0.4**										**5.4**	
Carson City	4,720	82	92	25.21	30.00	+.02	35.1	-6.1	61	31	46	4	4	24	38	31	25	69	1.25	-0.1	8	5,562	nw.	64	sw.	2	20	6	5	3.0	15.8
Winnemucca	4,344	59	70	25.54	29.98	-.03	35.3	-5.4	62	31	45	14	29	25	34	30	23	63	0.46	-0.4	8	7,370	sw.	60	sw.	2	7	6	18	6.8	3.1
Modena	5,479	10	38	24.51	29.91	-.05	33.6	...	61	31	46	8	25	21	41	27	16	53	0.54	...	6	7,862	w.	43	sw.	2	8	14	9	5.6	10.3
Salt Lake City	4,366	105	110	25.54	29.95	-.03	38.1	-3.5	58	8	46	21	30	31	27	32	24	58	1.22	-0.8	12	5,107	se.	38	w.	2	9	7	15	6.0	8.9
Grand Junction	4,608	43	51	25.27	29.94	.00	39.2	-2.7	63	18	51	17	30	28	37	30	19	50	0.45	-0.4	7	4,654	nw.	31	s.	14	9	7	15	5.8	3.2
Northern Plateau.							**39.3**	**-0.5**										**66**	**0.83**	**-1.0**										**6.8**	
Baker City	3,471	53	58	26.36	29.99	-.04	35.8	+0.3	54	31	43	18	29	29	24	30	23	62	0.83	-1.0	9	4,688	se.	26	s.	6	1	9	21	7.9	7.7
Boise	2,739	61	68	27.12	30.01	-.02	40.9	-3.0	60	31	49	20	29	33	25	34	25	58	0.92	-0.9	9	4,678	nw.	29	e.	2	4	14	13	6.9	6.6
Lewiston	757	52	61	29.14	29.96	-.07	45.4	...	72	31	55	26	29	36	37	...	...	...	0.92	...	12	3,204	e.	28	w.	2	4	15	12	6.5	0.8
Pocatello	4,482	46	54	25.38	29.97	-.04	34.6	+0.3	54	31	42	14	29	28	28	31	26	71	0.82	-1.4	11	8,174	se.	29	s.	8	5	20	6	5.8	7.9
Spokane	1,943	99	107	27.89	29.96	-.05	39.8	+0.1	61	31	48	22	30	32	29	34	26	62	0.87	-0.5	13	5,450	s.	33	sw.	12	2	8	21	7.7	0.4
Walla Walla	1,000	65	73	28.88	29.97	-.05	45.4	-0.1	66	31	54	24	30	37	34	42	38	75	0.69	-1.1	9	6,139	s.	27	sw.	14	3	20	8	5.9	T.
N. Pac. Coast Reg.							**43.9**	**-1.3**										**78**	**6.49**	**+1.0**										**7.6**	
Neah Bay	50	7	50	29.86	29.90	-.06	42.6	-1.9	53	30	47	33	13	38	16	41	38	83	12.74	+2.2	26	7,222	e.	44	w.	12	6	5	20	7.5	T.
Port Crescent	259	13	20	29.67	29.90	-.08	41.0	-0.6	55	31	47	26	29	35	22	...	...	...	4.06	-0.6	22	3,125	w.	28	w.	12	3	11	17	7.4	T.
Seattle	123	114	151	29.85	29.97	-.02	45.0	-0.4	66	31	51	31	29	39	25	41	36	75	4.19	+1.1	19	6,618	s.	34	sw.	12	3	14	14	6.9	0.2
Tacoma	213	113	120	29.75	29.98	-.02	43.8	-0.6	64	31	50	29	29	38	26	...	...	...	5.00	+1.1	21	5,705	sw.	28	sw.	14	2	10	19	7.7	1.5
Astoria	20	57	64	...	...	...	44.6	-1.5	62	31	50	36	*	39	20	...	...	...	10.41	+3.3	28	...	sw.	...	...	...	2	12	17	7.6	T.
Portland, Oreg	154	203	213	29.84	30.01	-.01	45.0	-2.2	62	31	50	30	28	40	23	42	38	80	5.79	+0.2	24	7,530	s.	42	s.	4	1	9	21	8.4	T.
Roseburg	518	56	67	29.48	30.04	.00	45.6	-2.1	69	30	53	30	29	38	32	41	37	76	3.22	-0.3	19	3,038	sw.	22	sw.	17	1	11	19	7.9	T.
Mid. Pac. Coast Reg.							**50.4**	**-1.9**										**72**	**3.72**	**-0.3**										**4.3**	
Eureka	62	62	80	30.03	30.10	+.04	46.8	-1.8	58	4	52	33	24	42	16	44	40	79	7.85	+1.7	20	7,308	se.	44	nw.	13	6	14	11	5.9	
Mount Tamalpais	2,375	11	18	27.54	30.04	-.02	44.9	...	64	29	51	30	24	39	19	39	32	69	4.29	...	13	15,725	nw.	80	nw.	13	12	12	7	4.5	T.
Red Bluff	332	50	56	29.67	30.04	.00	51.6	-2.9	71	29	61	33	14	42	25	44	36	61	3.94	+0.7	8	5,821	n.	35	se.	5	14	13	4	3.9	3.0
Sacramento	69	106	117	29.95	30.02	-.01	52.2	-2.5	73	30	60	38	3	44	25	47	42	71	1.99	-1.0	8	7,093	se.	62	s.	2	12	13	6	4.5	
San Francisco	155	161	167	29.91	30.08	+.02	51.6	-2.0	68	29	58	41	24	46	20	48	45	82	2.65	-0.4	11	7,235	w.	60	s.	1	18	9	4	3.5	
Point Reyes Light	490	10	30	29.48	29.99	...	49.6	-0.5	64	29	55	37	24	44	19	...	...	...	2.15	-2.3	11	21,305	nw.	108	sw.	1	19	2	10	3.6	
S. Pac. Coast Reg.							**53.6**	**-1.9**										**70**	**2.67**	**+0.4**										**4.0**	
Fresno	330	67	70	29.68	30.04	+.03	52.0	-2.5	80	30	62	36	24	42	31	46	40	68	1.14	-0.2	7	4,483	nw.	23	se.	1	12	15	4	4.3	
Los Angeles	338	74	82	29.66	30.02	.00	55.0	-1.3	81	17	65	37	25	45	32	48	42	70	2.98	0.0	9	3,865	w.	21	e.	2	13	14	4	4.3	
San Diego	87	94	102	29.93	30.02	.00	54.8	-1.2	76	17	61	43	15	48	26	49	44	71	1.86	+0.3	7	5,049	nw.	27	nw.	24	17	8	6	3.7	
San Luis Obispo	201	10	46	29.87	30.09	+.03	52.5	-2.7	79	16	63	32	25	42	32	46	42	73	4.68	+1.7	9	4,274	w.	26	s.	2	16	9	6	3.8	
West Indies.																															
Basseterre	29	41	54	29.94	29.96	-.05	75.9	...	83	21	81	66	29	71	15	70	67	75	3.30	...	18	7,035	e.	22	e.	5	11	15	5	4.6	
Bridgetown	30	57	65	29.90	29.93	-.03	77.8	+1.8	86	28	84	67	28	72	19	71	67	70	0.88	-0.4	9	6,862	ne.	25	ne.	8	11	10	10	5.1	
Cienfuegos	52	62	67	29.94	29.99	-.02	73.6	...	89	26	82	52	6	65	26	67	64	77	3.41	...	3	6,334	ne.	25	ne.	11	22	9	0	2.7	
Grand Turk	11	6	20	30.03	30.04	+.02	77.2	...	90	22	84	61	20	70	22	...	...	...	1.08	...	4	...	se.	...	...	...	11	13	7	5.1	
Havana	57	87	105	29.95	30.01	.00	73.0	-0.2	87	24	81	56	4	65	24	68	66	84	0.96	-0.9	3	9,384	e.	38	ne.	10	20	10	1	3.0	
Kingston	286	38	52	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Port of Spain	40	65	66	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Puerto Principe	352	55	62	29.66	30.02	+.01	74.4	...	95	24	85	55	20	64	33	66	64	78	0.37	...	2	6,465	ne.	25	e.	10	22	4	5	3.1	
Roseau	25	37	47	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
San Juan	82	48	90	29.90	29.99	-.03	75.4	...	85	26	81	67	31	70	15	69	66	74	4.08	+1.8	15	8,293	e.	30	e.	8	12	11	8	5.0	
Santiago de Cuba	82	46	52	29.89	29.96	-.04	75.6	...	90	26	84	61	20	67	26	68	66	76	2.06	...	6	5,622	n.	30	nw.	6	16	13	2	3.9	
Santo Domingo	57	37	44	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Willemstad	75	39	46	29.81	29.89	-.02	79.0	...	86	22	84	69	4	74	13	72	69	75	2.22	...	11	8,602	e.	22	ne.	29	0	22	9	6.5	

NOTE.—The data at stations having no departures are not used in computing the district averages. * More than one date.

TABLE II.—*Climatological record of voluntary and other cooperating observers, March, 1902.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Alabama.					
Ashville	74	20	52.0	10.22	
Benton				9.93	
Bermuda	82	28	60.0	9.32	
Birmingham	77	22	55.9	10.41	
Bridgeport				6.62	
Burkville				10.25	
Calera				12.60	
Camphill	77	26	54.8	10.08	
Citronelle	80[c]	32	61.6[c]	8.58	
Clanton[d]	75	23	53.8		
Cordova	79	24	53.6	10.23	
Daphne	79	29	60.8	6.43	
Decatur	76	20	53.8	6.38	
Demopolis				7.96	
Eufaula *a*	80	29	57.0	11.72	
Eutaw	81	29	56.4	10.43	
Evergreen	78	32	57.6	7.56	
Flomaton	79	28	61.2	6.68	
Florence *a*				6.23	
Florence *b*	76	20	53.3	6.76	
Fort Deposit	77	30	56.8	6.87	
Gadsden	80	22	52.8	9.98	
Goodwater	80	24	53.4	11.12	
Greensboro	77	29	55.2	12.69	
Greenville				7.75	
Hamilton	75	22	53.5	8.39	
Highland Home	78	29	58.4	7.67	
Letohatchee				7.77	
Livingston *a*	78	27	55.4	10.31	
Lock No. 4	76	23	52.8	9.26	
Madison Station	75	19	52.5	5.70	
Maplegrove	76	19	49.8	10.57	
Marion	77	27	55.9	8.60	
Mount Willing	80	30	59.0	8.63	
Newbern	80	28	58.2	8.17	
Newburg	77	20	53.0	7.82	
Oneonta	74	18	52.3	9.41	T.
Opelika	73	26	53.8	12.48	
Oxanna	78	22	55.1	7.59	
Prattville[d]	80	25	57.2		
Pushmataha	78	27	57.9	8.11	
Riverton	75	20	51.8	12.48	
Scottsboro	74	19	50.3	6.85	T.
Selma	81	30	57.2	6.28	
Talladega	76	23	54.6	10.96	
Tallassee				12.04	
Thomasville	78	30	59.2	5.31	
Tuscaloosa	79	25	53.8	9.20	
Tuscumbia	76			6.11	
Tuskegee	80	28	55.8	9.92	
Union Springs	78	28	55.7	10.82	
Uniontown	76	29	56.8	7.46	
Valleyhead	75	17	49.6	5.86	
Verbena				11.55	
Wetumpka	78	28	58.2	10.40	
Alaska.					
Fort Egbert	42	−45	−6.6	0.17	2.4
Fort Liscum	44	− 8	20.4	4.70	65.0
Killisnoo	45	6	29.6	1.50	12.5
Orca	45	2	21.5	0.60	4.0
Sitka	50	7	34.0	5.39	13.0
Arizona.					
Agua Caliente	85	25	54.2	0.33	
Allaire Ranch				0.51	5.0
Arizona Canal Co's Dam	85	36	58.0	0.45	
Aztec *[1]	91	40	62.7	0.30	
Benson *[1]	76	34	54.2	T.	T.
Bisbee	73	25	49.4	0.29	2.5
Buckeye	80	29	55.6	0.60	
Casagrande *[1]	67	39	52.2	0.46	
Champie Camp	88	25	53.8	0.90	
Cochise *[5]	77[h]	29[h]	53.6[h]	0.45	4.0
Congress	79	28	52.8	1.30	8.0
Dragoon Summit *[1]	70	28	42.3	0.45	4.0
Dudleyville	84	22	53.3	0.64	T.
Duncan	80	14	47.2	0.71	2.0
Fort Apache	72	16	40.0	0.53	T.
Fort Defiance	57	9	33.4	1.03	3.5
Fort Grant	82	21	53.6	0.15	0.5
Gilabend *[1]	90	42	64.5	0.00	
Globe	75	25	49.8	0.35	4.0
Ingleside	81	34	56.0	0.50	
Jerome	69	22	46.2	1.50	
Maricopa *[1]	80	32	53.1	0.20	
Mesa	82	32	56.2	0.35	
Mohawk Summit *[1]	87	45	59.6	0.33	
Mount Huachuca	75	25	50.0	0.41	1.5
Natural Bridge				1.85	6.0
Nogales	81	26	49.4	0.50	3.0
Oracle	73	25	49.8	1.25	8.5
Oro				0.07	
Parker	92	29	58.0	0.45	
Phoenix	84	33	56.0	0.36	
Pima	78	24	51.4	0.29	
Pinal Ranch				1.23	8.5
Prescott	70	10	38.2	1.73	15.0
St. Johns	71	12	41.2	0.20	2.2
San Carlos	81	27	52.6	0.23	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
***Arizona*—Cont'd.**					
Showlow				0.62	5.0
Signal	88	25	54.2	0.50	
Silverking				0.40	0.7
Superstition				0.73	
Taylor	67	12	34.2	0.22	1.0
Tombstone	75	24	50.4	0.31	
Tonto	78	30	52.5	0.63	
Tuba	65	18	40.4	0.45	4.5
Tucson	84	28	54.1	0.44	1.5
Vail *[1]	80	32	54.1	0.65	6.5
Walnut Grove				0.05	
Willcox *[1]	75	25	48.2	0.60	6.0
Yarnell				1.30	11.0
Arkansas.					
Alco	78	18	49.3	4.40	
Amity	82	25	53.4	4.88	
Arkadelphia	88	26	55.6	7.90	
Arkansas City				8.26	
Batesville	76	22	51.6	3.12	
Blanchard Springs	82	23	54.8	6.11	
Brinkley	77	25	54.2	5.92	
Camden *a*				4.69	
Camden *b*	85	26	55.6	4.72	
Conway[e]	84	27	55.1	5.42	
Corning	78	21	49.6	2.88	T.
Dallas	78	23	52.4	5.65	
Dardanelle				2.86	
Dutton	73	14	48.2	5.77	
Elon	86[e]	20[f]	53.5[e]	8.09	
Fayetteville	79	23	50.0	5.10	
Forrest City	70	24	49.8	4.89	
Fulton				6.30	
Helena *a*				9.14	
Helena *b*				9.37	
Jonesboro	82	26	54.0	6.23	T.
Keesees Ferry	77	16	50.6	2.22	
Lacrosse	76	26	51.2	2.35	
Lonoke	78	24	52.4		
Lutherville	87			4.17	
Marianna	70	25	50.2	5.54	
Marvell	78	26	54.5	7.09	
Mountain Home	80	18	51.7	3.20	
Mount Nebo	72	18	50.2	3.46	
New Gascony	80	25	55.0	6.83	
Newport *a*				4.85	
Newport *c*	78	24	53.0	5.47	
Oregon	79	14	48.2	3.17	
Osceola	75	23	52.6	5.73	
Ozark	77	22	52.9	4.30	
Pinebluff	84	27	53.8	9.27	
Pocahontas	82	20	51.5	3.14	
Pond	79	14	48.3	7.33	
Prescott	84	27	56.6	5.93	
Rosadale	83	27	56.1	5.31	
Russellville	77	25	50.6	2.62	
Silversprings	80	16	49.0	3.44	
Spielerville	82	22	53.6	3.38	
Stuttgart	77	25	54.0	6.91	
Texarkana	89	27	58.2	6.10	
Warren	81	25	56.0	6.66	
Washington	79	27	55.1	6.24	
Wiggs	83	19	53.0	4.63	
Winchester	81	28	55.7	6.48	
Winslow	71	14	46.8	6.30	
Witts Springs	79	15	46.8	3.55	
California.					
Angiola	83	29	50.9	1.16	
Azusa	86	34	56.2	3.83	T.
Bakersfield	85	31	52.4	0.89	
Ballast Point L. H				1.68	
Bear Valley				8.63	89.0
Berkeley	67	37	50.4	4.17	
Bishop	70	20	43.4	1.53	0.8
Boca *[1]	65	−16	30.8	2.70	27.0
Bodie	48	−14	18.8	2.56	25.0
Bowman	62	10	35.0	9.26	74.0
Branscomb				11.26	T.
Caliente *[1]	85	40	55.4	3.65	
Campbell	78	34	50.2	3.45	
Campo				4.00	
Cape Mendocino L. H				7.25	
Cedarville	62	17	35.5	1.54	27.0
Chico *[1]	68	38	54.6	4.07	
Cisco *[1]	42	17	31.0	5.40	54.0
Claremont	78	29	50.0	4.47	
Corning *[1]	67	34	49.2	3.05	
Crescent City	60	32	46.4	8.24	
Crescent City L. H				7.38	
Cuyamaca *[6]	56	22	35.5	13.82	27.0
Delano *[1]	81	42	53.7	1.25	
Delta *[1]	73	32	48.3	8.48	
Drytown	76	30	49.2	3.14	
Dunnigan *[1]	72	32	51.8	3.28	
Durham *[5]	72	31	51.4	2.68	
East Brother L. H				3.45	
Edmanton *[1]	61	15	34.4	10.60	72.0
Elcajon	83	33	52.0	2.81	
Elmdale	81	29	49.8	1.00	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
***California*—Cont'd.**					
Elsinore	88	28	52.8	2.64	
Escondido	83	30	53.0	3.68	
Fallbrook	82	32	52.2	3.52	
Folsom City *[1]	80	35	52.0	3.46	
Fordyce Dam				10.90	115.0
Fort Bragg				5.93	
Fort Ross	67	36	49.9	6.75	
Foster				4.18	
Georgetown	67	23	45.0	6.47	12.0
Gilroy (near)	78	32	51.0	2.74	
Glendora				5.16	
Goshen *[1]	81	32	54.8	1.63	
Grass Valley				5.25	2.0
Greenville	69	15	38.6	5.08	41.0
Hanford	87	33	53.5	1.78	
Healdsburg	78	31	52.0	5.57	
Hollister	74	30	50.1	2.55	
Humboldt L. H				8.90	
Idylwild	63	11	37.4	5.53	22.3
Imperial	94	34	61.5	0.30	
Indio *[1]	84	46	63.2	0.00	
Iowa Hill *[1]	67	29	45.0	7.54	6.2
Irvine	86	46	60.1	2.91	
Jackson	72	24	44.6	4.37	3.0
Jolon				3.03	
Kennedy Gold Mine	67	24	43.1	4.79	
Kent	71	32	50.8	7.04	
Kono Tayee	67	35	48.2	3.85	
Lamesa				2.49	
Laporte *[1]	59	11	32.6	10.09	91.8
Las Fuentes Ranch				2.63	
Legrande	80	32	51.4	1.84	
Lemoncove	84	32	53.8	2.31	
Lemoore *[1]	78	25	53.2	1.50	
Lick Observatory	59	21	36.6	5.19	
Lime Point L. H				2.64	
Lodi	78	32	50.3	2.38	
Los Gatos *b*	73	34	49.7	7.59	
Mammoth *[1]	86	48	66.0	0.36	
Manzana	75	29	46.4	1.14	
Mare Island L. H				2.68	
Merced	80	28	48.5	2.25	
Mercury	78	32	53.8	6.17	
Mills College				3.92	
Milo				4.33	
Milton (near)	77	34	50.8	1.82	
Modesto *[1]	82	40	56.8	0.77	
Mohave *[1]	70	35	48.7	0.14	
Mokelumne Hill *[3]		31	44.6	4.12	
Monterio	74	26	45.1	4.25	
Monterey *[1]	64	40	53.6	4.22	
Mount St. Helena				4.35	
Mutah				2.80	6.0
Napa *b*	76	33	49.9	3.66	
Needles	80	45	62.9	0.05	
Nevada City	69	22	41.7	5.02	2.0
Newcastle	73	34	51.0	3.99	
Niles	76	36	51.7	3.27	
North Bloomfield	69	19	42.2	6.40	12.8
North Ontario	76	32	49.7	5.78	
North San Juan *[1]	60	29	44.2	5.90	0.5
Oakland	69	37	51.7	3.51	
Ogilby *[1]	88	54	65.9	0.15	
Oleta *[1]	69	28	45.0	5.07	1.0
Orland *[2]	70	33	51.6	2.59	
Palermo	76	28	50.4	2.98	
Paso Robles	75	28	46.8	2.50	
Peachland *[5]	73	32	51.0	4.94	
Piedras Blancas L. H				3.42	
Pigeon Point L. H				2.36	
Pilot Creek				9.00	52.8
Pine Crest	77	37	53.6	3.55	
Placerville	66	23	43.2	5.33	5.0
Point Ano Nuevo L. H				3.00	
Point Arena L. H				4.26	
Point Bonita L. H				4.41	
Point Conception L. H				2.38	
Point Fermin L. H				1.86	
Point George L. H				3.76	
Point Hueneme L. H				3.20	
Point Lobos	59	39	50.0	2.66	
Point Loma L. H				0.91	
Point Montara L. H				3.78	
Point Pinos L. H				3.72	
Point Sur L. H				2.89	
Pomona (near)	84	31	55.2	3.85	
Poway	81	33	53.4	3.13	
Quincy	63	20	39.6	4.24	24.2
Redding	72	31	50.4	4.73	0.1
Redlands	84	34	53.8	2.82	
Reedley	82	32	54.2	1.23	
Represa	70	32	50.8	3.68	
Riovista	72	36	52.2	1.81	
Riverside	87	30	53.2	2.23	
Roe Island L. H				1.77	
Rohnerville				8.99	T.
Rosewood	72	27	49.4	3.89	6.0
Sacramento	74	35	52.6	2.18	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Salinas	75	32	50.1	2.58	
Salton*[1]	88	40	65.0	0.81	
San Bernardino	84	29	53.2	3.89	
San Jacinto	80	30	52.0	2.31	
San Jose				2.65	
San Leandro	70	33	50.3	3.77	
San Luis L. H.				3.21	
San Mateo*[1]	70	40	50.7	3.53	
San Miguel*[1]	78	34	51.2	2.60	
San Miguel Island	65	40	50.3	2.52	
Santa Barbara	77	39	54.0	2.89	
Santa Barbara L. H.				1.18	
Santa Clara				3.12	
Santa Cruz	74	31	50.0	3.23	
Santa Cruz L. H.				3.32	
Santa Maria	77	33	51.4	2.37	
Santa Monica	73	35	53.0	3.27	
Santa Paula	85	36	56.0	3.31	
Santa Rosa*	72	31	53.4	4.54	
Shasta	88	29	52.4	5.33	2.0
Sierra Madre	76	35	52.8	5.19	
Snedden				2.00	14.0
Sonoma				3.90	
S. E. Farallone L. H.				2.30	
Stockton	72	36	50.4	1.85	
Storey	75	32	50.5	1.66	
Summerdale	58	12	35.4	8.19	33.0
Susanville	62	14	36.4	2.56	25.0
Tehama*[1]	67	38	53.5	2.90	
Tejon Ranch	80	37	52.4	1.74	
Templeton*[5]	67	30	46.2	3.28	
Trinidad L. H				6.50	
Truckee*[1]	58	30	37.4	5.60	56.0
Tulare *c*	90	32	53.8	2.14	
Ukiah	77	26	47.4	6.04	
Union				4.69	
Upperlake	76	28	47.5	3.87	
Upper Mattole*[1]	69	32	44.4	13.12	T.
Vacaville*	76	37	52.5	3.57	
Ventura	79	38	55.4	3.01	
Visalia		27		1.78	
Volcano Springs*[1]	90	45	63.4	0.50	
Wasco	86	43	57.4	0.96	
Westpoint				6.16	
West Saticoy				2.45	
Wheatland	72	32	50.4	2.76	
Williams*[1]	74	40	54.4	2.55	
Willits				7.67	T.
Wilmington*[1]	77	40	52.7	2.29	
Wire Bridge*[5]	75	33	50.6	4.95	
Yerba Buena L. H.				2.15	
Yreka	64	24	42.4	1.53	
Yuba City*[5]	77	33	55.2	2.42	
Zenia				9.03	17.0
Colorado.					
Alford	62	5	33.0	1.60	9.0
Arkins				1.20	5.2
Ashcroft	47	−12	19.3	1.38	24.5
Blaine	77	4	42.5	1.52	4.2
Boulder	66	9	39.1	1.48	9.5
Boxelder				2.91	15.0
Breckenridge	45	−13	18.9	1.32	21.0
Buenavista				0.52	6.5
Canyon	69	10	40.6	0.46	3.3
Castlerock	67	−5	35.2	1.09	7.5
Cedaredge	64	−8	36.5	0.42	5.5
Cheyenne Wells	70	1	39.7	1.92	3.0
Clearview	47	−9	23.0	2.65	41.0
Collbran	60	0	33.8		
Colorado Springs	64	6	34.8	0.77	8.0
Delta	67	6	37.4	0.06	T.
Durango	62	9	34.0	0.68	5.6
Fort Collins	64	2	35.2	1.50	2.5
Fort Morgan	66	2	37.8		
Fox	76	7	39.8	0.64	T.
Garnett	57	−5	27.6	T.	T.
Gilman				1.32	22.0
Gleneyre	66	2	35.0	0.97	8.0
Glenwood				0.76	
Greeley	64	3	31.8	0.16	T.
Grover				0.17	
Gunnison	53	−23	22.8	0.46	7.2
Hamps	68	−3	34.2	1.37	15.0
Hoehne	70	−1	39.6	0.56	3.0
Holly	75	9	43.7	1.80	2.0
Holyoke (near)	73[c]	4[c]	40.4[c]	1.64	
Husted	65	0	33.8	0.60	8.8
Lake Moraine	45	−10	21.4	1.82	28.0
Lamar	78	10	44.5	1.63	4.0
Laporte				1.23	1.0
Las Animas	75	6	42.8	1.71	6.0
Leadville (near)				1.77	28.0
Leroy	68	5	37.4	1.23	5.5
Longs Peak	45	0	22.8	1.36	18.5
Mancos	70	0	35.8	0.29	4.0
Marshall Pass				2.83	42.0
Meeker	54	−8	32.0	1.20	15.8
Mitchell				0.94	16.5

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Colorado—Cont'd.	°	°	°	*Ins.*	*Ins.*
Montrose				0.10	1.0
Moraine	49[1]	4	26.0[e]	1.39	19.8
Parachute	61	10	36.8	0.46	4.0
Perrypark				0.87	
Rangely	59	0	34.0	0.89	7.5
Rockyford	74	8	41.9	1.78	4.0
Rogers Mesa	62	7	34.8	0.31	3.4
Ruby				3.87	50.0
Russell	51	−10	24.8	0.80	11.5
Saguache	64	0	32.3	0.10	1.0
Salida	64	3	33.3	0.27	2.8
San Luis	60	−1	30.8	0.63	6.8
Santa Clara	58	0	31.8	1.20	14.0
Sapinero				0.39	7.5
Seibert				1.60	3.0
Silt	61	5	34.0	0.42	5.3
Sugarloaf	55[e]	4[e]	37.7[e]	2.27	26.0
Trinidad	67	4	39.0	0.57	6.0
Twinlakes				0.22	3.2
Vilas				1.57	1.5
Wagon Wheel	54	−15	24.2	0.32	5.5
Walden	48	−12	23.5	1.00	14.8
Wallet				1.05	T.
Westcliffe	52	−9	28.6	1.21	16.9
Whitepine	45	−18	17.2	1.55	20.5
Wray	71	9	41.1	1.05	T.
Yuma				0.95	T.
Connecticut.					
Bridgeport	68	13	42.3	6.55	9.3
Canton	67	10	39.0	5.38	11.0
Colchester	64	20	41.8	6.09	9.0
Falls Village				4.59	10.0
Hartford *b*	65	18	41.6	6.12	9.0
Hawleyville	64	16	40.5	4.89	11.6
Lake Konomoc				7.75	
Middletown	68	12	42.6	6.01	8.5
New London	63	23	42.0	2.22	T.
North Grosvenor Dale	68	10	40.2	5.47	
Norwalk	65	9	40.9	5.71	7.0
Southington	65	10	41.4	6.45	7.0
South Manchester				3.58	11.0
Storrs	66	20	40.8	6.35	6.2
Voluntown	67	13	41.1	6.87	10.0
Wallingford				7.39	9.0
Waterbury	67	10	42.0	5.56	11.0
West Cornwall	65	15	37.0	4.68	9.8
Winsted	63	18	39.4		
Delaware.					
Milford	75	19	48.2	3.15	
Millsboro	72	20	45.7	3.86	
Newark	74	16	43.6	4.95	
Seaford	75	20	47.1	2.98	
District of Columbia.					
Distributing Reservoir*[5]	76	21	47.0	5.03	
Receiving Reservoir*[5]	74	20	46.3	4.33	
West Washington	82	17	46.0	4.11	1.6
Florida.					
Archer	85	34	63.2	6.57	
Avon Park	88	39	69.4	3.29	
Bartow	91	38	69.5	2.02	
Bonifay	81	31	61.0		
Carrabelle	82	35	61.8	6.34	
Clermont	89	38	58.2	3.61	
De Funiak Springs	82	29	61.1	13.62	
Deland	88	35	66.2		
Eustis	88[e]	38[d]	67.0[d]	4.56	
Federal Point	85	29	62.8	3.77	
Fernandina	81	35	60.0	5.25	
Flamingo	85	46	70.7	0.00	
Fort Meade	88	35	65.8	3.28	
Fort Myers	88	43	68.6	0.18	
Fort Pierce	90	44	68.4	2.95	
Gainesville	86	35	64.0	4.15	
Holt	81	30	57.6	6.09	
Huntington	87	35	64.5	4.08	
Hypoluxo	89	42	70.6	1.62	
Inverness	85	36	64.8	4.95	
Jasper	83	34	61.0	8.08	
Kissimmee	88	38	67.2	1.88	
Lake Butler	85	34	61.8	6.27	
Lake City	85	35	63.0	6.83	
Macclenny	86	32	63.3	7.98	
Malabar	89	39	67.4	0.83	
Manatee	87	40	67.4	1.36	
Marco	86	42	71.0	0.61	
Marianna	84	32	60.2	12.38	
Merritt Island	84	40	67.6	1.05	
Miami	89	40	70.6	0.00	
Micanopy	85	34	64.6	6.20	
Middleburg	84	28	61.4	7.04	
New Smyrna	88	35	65.0	1.89	
Nocatee	89	38	68.2	1.46	
Ocala	89	35	64.2	6.61	
Orange City	88	32	66.8	2.37	
Orlando	85	40	67.4	1.81	
Pinemount	87	32	61.4	4.90	
Plant City	89	34	66.0	1.16	
Quincy	85	29	60.2	10.81	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Florida—Cont'd.	°	°	°	*Ins.*	*Ins.*
Rockwell	86	34	64.4	5.80	
St. Andrews	84	31	61.4	7.79	
St. Leo	88	37	67.2	2.34	
Sumner	82	31	62.7	6.16	
Switzerland	84	30	63.0	3.45	
Tallahassee	81	34	59.6	11.06	
Tarpon Springs	87	35	65.9	4.04	
Titusville	86	40	66.2	2.73	
Waukeenah	89	30	61.7	4.20	
Wausau	85	28	61.2	12.83	
Wewahitchka	82	31	58.8	11.10	
Georgia.					
Adairsville	73	20	51.6	5.92	
Albany				11.98	
Allapaha				11.64	
Allentown	79	26	57.2	8.84	
Alpharetta	74	19	51.3	8.27	
Americus	76	29	56.2	13.13	
Athens *b*	74	23	51.4	6.06	
Auburn[d]	74	21	52.4	8.07	
Bainbridge	82	32	60.8	11.85	
Blakely	78	32	59.2	13.40	
Bowersville	75	22	49.6	6.05	
Brent	77	26	54.6	10.57	
Camak	76	26	54.6	6.78	
Canton				4.76	
Carlton				6.50	
Clayton	72	19	47.6	7.81	
Columbus	73	31	55.8	9.79	
Covington	77	22	52.6	5.97	
Dahlonega	73	17	49.8	5.92	T.
Diamond	77	13	48.2	5.93	T.
Douglas	85	29	60.4	10.25	
Dublin				8.97	
Eastman	80[f]	28	56.8[d]		
Elberton	77	24	54.3	6.53	
Experiment	75	23	53.6	7.66	
Fitzgerald	80	30	57.8	8.42	
Fleming	85	24	57.2	8.54	
Fort Gaines	78	31	57.4	10.41	
Gainesville	68	21	48.2	7.58	
Gillsville	74	20	51.4	6.24	
Greenbush	74	19	50.2	6.45	
Griffin	78	23	53.3	7.54	
Harrison	82	28	56.8	8.65	
Hawkinsville	82	28	56.3	11.09	
Hephzibah	80	30	57.2	7.51	
Jesup	82	30	58.7	9.41	
Lost Mountain	74	19	52.6	6.99	
Louisville	80[c]	28[b]	57.1[c]	7.28	
Lumpkin	78	27	57.4	9.57	
Marshallville	79	30	57.9	9.90	
Mauzy	86	29	60.4	8.83	
Milledgeville	76	24	52.8	8.61	
Millen	82	29	57.2	5.15	
Naylor	84	33	60.4	8.40	
Newnan	73	21	51.6	7.71	
Point Peter	76	23	50.0	7.02	
Poulan	84	28	58.4	9.17	
Putnam	79	28	57.7	11.25	
Quitman	82	30	60.0	9.12	
Ramsey	73	18	51.4	6.08	T.
Resaca				5.61	
Rome	77	21	51.5	6.42	
St. Marys	84	29	60.0	6.22	
Statesboro	84	28	57.8	5.67	
Stillmore	82	29	57.8	7.68	
Talbotton	78	26	56.0	9.52	
Thomasville	83	34	60.8	10.16	
Toccoa	75	22	49.2	5.94	
Valona	82	29	58.8	8.57	
Vidalia	84	29	56.7	8.07	
Washington		26		7.74	
Waverly	86	29	60.4	7.42	
Waycross	80	32	58.5	9.02	
Waynesboro	80	28	56.6	4.62	
Westpoint	74	26	55.2	8.22	
Woodbury	76	25	54.0	7.30	
Idaho.					
Albion	60	10	35.0	0.80	5.5
American Falls	59	12	34.9	0.68	
Blackfoot	62	17	35.6	0.20	2.0
Burnside	43	4	24.9	0.55	5.5
Chesterfield	56	−8	23.4	0.82	18.0
Downey	60	10	33.8	1.50	8.0
Forney	51	−10	24.0	1.92	14.5
Garnet	65	22	42.6	1.12	0.5
Grangeville	56	17	36.6		
Hailey	52	−1	26.6	1.61	6.6
Idaho City	58	11	33.6	1.16	11.6
Lake	44	−14	20.2	2.60	26.0
Lakeview	52	20	38.0	2.03	3.0
Lost River	51	2	28.8	0.85	8.5
Moscow	61	15	36.4	1.18	2.4
Murray	58	14	39.0	1.95	18.0
Oakley	58	11	35.3	0.53	2.0
Ola	62	15	38.4	1.91	6.4
Payette	60	19	41.8	0.68	1.0

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Idaho—Cont'd.	°	°	°	*Ins.*	*Ins.*
Pollock	67	20	40.4	1.11	......
Porthill	50	17	35.2	1.30	9.0
Priest River	58	13	35.2	2.44	12.5
Riddle	59[c]	8	30.8[c]	1.15	11.5
St. Maries	59	17	38.4	2.08	8.5
Silver City	48	0	27.0	3.33	44.0
Soldier	45	− 4	24.2	2.69	13.6
Swan Valley	50	2	29.3	1.86	18.5
Vernon	50	0	28.3	0.95	9.5
Weston	58[d]	7[c]	33.6[d]	1.06	5.0
Illinois.					
Albion	75	11	46.2	2.86	0.7
Aledo	69	2	40.4	2.57	T.
Alexander	72	9	43.8	3.05	0.8
Antioch	66	4	38.4	1.95	T.
Ashton	67	1	38.8	1.76	1.5
Astoria	70	8	42.2	4.08	2.2
Aurora	68	3	39.6	3.14	1.5
Beardstown	......	......	......	5.24	
Benton	76	14	48.4	3.66	
Bloomington	74	8	43.0	4.45	2.5
Bushnell	74	6	41.4	......	......
Cambridge	68	5	40.0	2.90	T.
Carlinville	74	12	44.7	4.18	0.8
Centralia	77	14	48.1	3.89	T.
Charleston	70	10	44.2	3.77	T.
Chemung	65	− 4	37.2	1.83	T.
Chester	......	......	......	4.06	
Cisne	77	13	47.4	3.65	T.
Coatsburg	73	7	42.8	4.31	T.
Cobden	75	14	48.7	4.22	T.
Danville	75	10	45.2	2.60	T.
Decatur	72	9	43.4	3.93	0.3
Dixon	70	1	40.7	1.81	1.0
Dwight	71	6	40.7	3.82	T.
Effingham	76	12	46.9	1.30	
Equality	77	11	47.7	3.09	T.
Flora	76	12	46.2	2.64	T.
Friendgrove*[b]	72	14	46.6	3.41	T.
Galva	68	3	39.3	4.17	1.1
Grafton	......	......	......	3.95	
Greenville	76	11	45.0	4.19	
Griggsville	71	10	43.3	2.67	T.
Halfway	74	14	47.5	3.16	T.
Halliday	73	13	48.9	2.87	
Havana	73	9	44.2	4.31	0.1
Henry	70	5	41.6	3.60	0.8
Hillsboro	75	13	44.6	4.95	T.
Joliet	68	5	39.3	5.51	3.8
Kishwaukee	67	0	38.6	3.17	0.3
Knoxville	70	2	40.2	3.66	0.2
Lagrange	71	5	39.4	3.19	3.2
Laharpe	70	6	41.4	3.40	T.
Lanark	65	0	38.0	1.44	0.2
Lasalle	66	4	41.2	3.57	
Loami	......	......	......	2.96	T.
McLeansboro	75	14	46.8	3.83	T.
Martinsville	......	......	......	3.49	T.
Martinton	72	9	41.6	4.14	3.5
Mascoutah	72	15	47.2	4.78	0.3
Mattoon	76	12	46.1	4.96	0.2
Melrose	73	11	44.6	1.97	
Minonk	69	6	40.1	3.89	3.0
Morgan Park	......	......	......	4.76	4.0
Morrison	66	2	40.2	2.46	1.0
Morrisonville	73	12	43.8	4.20	T.
Mount Carmel	......	......	......	2.99	1.5
Mount Pulaski	73	9	43.6	4.15	1.5
Mount Vernon	75	12	46.2	3.92	
New Burnside	73	14	48.4	3.08	T.
Olney	73	13	45.8	2.64	T.
Ottawa	70	6	42.1	4.89	1.5
Palestine	72	12	45.0	3.77	T.
Pana	71	12	44.0	3.83	T.
Paris	70	10	43.2	2.93	T.
Peoria *a*	......	......	......	4.80	2.0
Peoria *b*	70	10	42.2	2.71	0.2
Philo	73	9	42.6	3.18	
Plumhill	75	15	45.8	4.18	
Rantoul	74	9	42.8	3.09	0.5
Raum	74	12	47.2	2.82	1.2
Riley	65	0	38.2	2.31	2.1
Robinson	73	12	45.4	2.98	T.
Rushville	70	8	42.6	4.67	1.0
St. John	74	13	46.4	4.20	
Shobonier	76	12	45.0	4.24	T.
Strawn	73	8	41.2	3.55	T.
Streator	70	6	41.5	4.66	T.
Sullivan	73	9	43.4	2.42	T.
Sycamore	72	3	39.8	3.27	T.
Tilden	75	15	46.6	4.47	T.
Tiskilwa	66	3	39.6	3.29	1.0
Tuscola	72	10	43.0	3.95	T.
Walnut	70	4	41.0	2.09	0.2
Wellington	70	10	41.5	1.88	T.
Winchester	73	12	43.4	4.29	T.
Winnebago	66	0	38.7	2.86	1.0
Yorkville	68	4	39.8	2.70	1.5

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Illinois—Cont'd.	°	°	°	*Ins.*	*Ins.*
Zion	65	− 1	38.2	2.01	T.
Indiana.					
Anderson	68	10	43.1	3.27	2.0
Angola	66	8	40.0	4.04	0.5
Auburn	69	8	40.8	2.73	T.
Bloomington	69	10	46.9	2.89	T.
Bluffton	70	9	42.4	3.37	T.
Butlerville	70	10	44.6	3.31	3.0
Cambridge City	69	9	41.8	4.16	1.5
Columbus	70	10	44.7	2.81	T.
Connersville	69	10	42.8	3.61	0.5
Delphi	72	10	41.6	2.36	1.0
Edwardsville*[1]	72	11	47.2	2.58	5.5
Fairmount	71	9	42.2	3.36	2.0
Farmland	69	12	42.2	3.39	1.0
Fort Wayne	70	11	41.6	3.33	0.5
Franklin*[1]	68	13	44.5	1.42	2.2
Greencastle	66	9	42.6	3.39	0.7
Greensburg	70	7	43.8	2.18	1.0
Hammond	66	7	36.4	4.52	4.0
Hector	73	8	42.6	3.23	3.0
Huntington	69	12	42.0	3.32	2.5
Jeffersonville	75	12	46.6	2.37	5.0
Knightstown	70	10	43.8	4.01	2.5
Kokomo	69	12	43.4	2.88	2.0
Lafayette	69	11	42.4	3.21	1.9
Laporte	77	8	41.0	4.22	4.2
Logansport	73	10	41.9	2.00	T.
Madison *a*	72	11	46.2	2.36	4.8
Madison *b*	......	......	......	1.97	4.6
Marengo	73	12	46.2	3.41	4.0
Marion	71	10	43.2	3.51	1.5
Markle	69	9	41.6	3.45	1.5
Mauzy	69	9	42.3	4.32	2.5
Moores Hill	74	......	46.0	2.33	T.
Mount Vernon	76	14	46.6	2.91	T.
Northfield	68	8	41.4	2.48	0.5
Paoli	78	10	45.0	4.01	2.5
Prairie Creek	73[d]	12[d]	43.7[d]	3.30	T.
Princeton	75	12	46.6	2.18	1.0
Rensselaer	68	10	41.6	3.23	1.2
Richmond	71	10	44.1	3.28	1.0
Rockville	71	10	43.2	3.03	T.
Salem	78	9	47.8	3.60	2.8
Scottsburg	72	11	46.8	2.48	4.5
Seymour	70	10	44.4	3.50	1.1
South Bend	69	8	40.6	3.85	4.5
Syracuse	69	8	40.9	3.34	4.0
Terre Haute	70	12	45.6	2.78	T.
Topeka	66	10	40.6	2.54	T.
Valparaiso	69	7	39.6	2.79	T.
Veedersburg	71	10	43.8	3.36	0.2
Vevay	72	14	46.1	1.65	5.5
Vincennes	76	13	46.0	2.99	T.
Washington	80	12	47.0	2.35	
Winamac[e]	70	4	39.9	3.89	0.5
Worthington	73	11	45.3	3.51	0.7
Indian Territory.					
Ardmore	86	29	55.8	3.97	
Chickasha	82	22	52.7	2.85	
Durant	85	27	55.2	6.40	
Fairland	79	20	48.6	4.65	
Hartshorne	81	28	53.3	5.51	
Healdton	83	18	54.8	3.72	
Holdenville	78	24	51.8	4.45	
Marlow	80	21	54.5	3.34	
Muscogee	85	12	51.6	3.91	
Pauls Valley	79	22	51.0	5.50	
Roff[j]	80	26	53.3	3.15	
Ryan	83	28	56.3	2.59	
South McAlester	......	......	......	5.59	
Tahlequah	79	20	51.6	7.81	
Tulsa	......	......	......	3.38	
Webbers Falls	81[d]	25[d]	52.8[d]	5.04	
Iowa.					
Afton	72	1	39.8	0.71	T.
Albia	73	2	41.0	0.91	T.
Algona	66	− 6	37.1	0.13	0.8
Alta	70	− 4	36.9	0.87	1.3
Amana	70	− 1	39.2	1.45	T.
Ames *b*	70	− 1	40.1	2.70	0.5
Atlantic	72	2	40.2	2.08	1.5
Baxter	73	0	39.4	0.90	0.5
Belknap	71	3	41.0	1.59	1.0
Belleplaine	69[c]	− 2[b]	38.0[c]	3.45	0.5
Bonaparte	72	4	40.6	1.84	T.
Britt	67	− 7	36.6	0.46	0.8
Buckingham	......	......	......	1.60	T.
Burlington	73	5	42.1	2.52	T.
Bussey	......	......	......	0.66	T.
Carroll	75	− 2	40.2	2.33	3.0
Cedar Rapids	68	− 2	39.6	1.55	0.2
Centerville	72	3	41.2	1.20	T.
Chariton	72	3	40.4	1.10	1.5
Charles City	67	− 7	37.0	2.19	2.0
Clarinda	74	4	41.8	0.92	0.2
Clearlake	69	− 8	38.0	0.65	2.0
Clinton	67	1	39.7	2.19	T.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Iowa—Cont'd.	°	°	°	*Ins.*	*Ins.*
College Springs	73	......	......	1.95	......
Columbus Junction	69	2	40.0	2.06	T.
Corning	70	3	38.6	1.08	1.0
Council Bluffs	78	4	42.2	0.56	T.
Cresco	64	− 7	35.6	......	......
Cumberland	......	......	......	4.33	4.0
Danville	......	......	......	2.47	......
Decorah	66	− 5	37.6	1.17	2.0
Delaware	65	− 4	36.6	1.78	0.5
Denison	70	− 5	38.8	1.60	1.0
De Soto	68	3	41.4	1.97	0.7
Dows	66	− 7	36.8	2.12	1.0
Earlham	72	1	39.6	1.33	1.0
Eldon	73	4	40.8	1.24	T.
Elkader	66	− 4	38.4	2.17	0.5
Emerson	......	......	......	0.52	......
Estherville	72	−12	35.2	0.73	2.0
Fairfield	73	3	39.8	1.43	T.
Fayette	66	− 6	36.7	2.27	3.8
Fonda	......	......	......	1.09	1.0
Forest City	65	− 8	35.5	0.20	T.
Fort Dodge	68	− 3	38.0	2.15	T.
Fort Madison	......	......	......	2.57	T.
Galva	72	− 4	37.8	0.22	0.1
Gilman	......	......	......	0.80	T.
Glenwood	74	3	42.4	1.92	T.
Grand Meadow	64	− 6	36.2	2.73	4.5
Greene	68	− 6	37.2	1.94	4.0
Greenfield	69	0	39.4	1.54	1.0
Grinnell	69	0	38.6	1.52	0.4
Grinnell (near)	70	− 2	38.4	1.18	T.
Grundy Center	68	− 4	37.6	2.08	T.
Guthrie Center	72	0	39.3	1.86	1.5
Hampton	68	− 5	37.6	2.88	3.0
Harlan	71	0	39.2	2.01	T.
Hopeville	......	......	......	0.98	......
Humboldt	68	− 4	39.0	0.86	......
Independence	70	− 7	37.0	1.51	0.7
Indianola	71	2	40.4	1.12	0.3
Iowa City	70	0	39.4	1.29	T.
Iowa Falls	67	− 5	36.5	2.15	1.0
Jefferson	......	......	......	1.21	T.
Keosauqua	78	5	41.7	1.85	T.
Knoxville	72	3	40.6	0.94	T.
Lacona	......	......	......	1.75	0.5
Larrabee	67	− 3	35.8	0.63	1.2
Leclaire	......	......	......	2.52	0.7
Lemars	68	− 5	37.2	0.65	T.
Lenox	70	1	39.8	0.83	0.5
Logan	72	2	40.4	0.43	T.
Maple Valley	......	......	......	0.80	1.0
Maquoketa	65	− 1	39.1	2.23	T.
Marshalltown	72	− 2	39.2	1.37	T.
Monticello	67	− 6	38.4	1.72	T.
Mountayr	72	2	40.2	0.69	T.
Mount Pleasant	70	2	39.2	1.93	0.8
Mount Vernon	68	− 4	38.3	1.73	1.1
New Hampton	66	− 8	36.4	1.94	1.0
Newton	68	− 1	68.3	1.01	T.
Northwood	66	− 7	37.0	0.55	0.5
Odebolt	70	− 4	39.0	0.99	0.8
Ogden	69	− 1	39.4	1.87	......
Olin	65	− 3	38.4	1.89	1.5
Onawa	70	0	40.0	1.23	......
Osage	66	− 7	36.8	1.19	4.4
Oskaloosa	71	2	38.6	0.97	0.8
Ottumwa	72	5	41.6	1.22	1.0
Ovid	72	3	40.7	1.12	T.
Pacific Junction	73	4	41.8	2.13	0.2
Perry	71	1	39.8	3.47	0.1
Plover	70	− 5	36.8	0.52	1.8
Primghar	68	− 5	37.4	......	......
Redoak	67	6	41.8	1.76	1.5
Ridgeway	67	− 6	38.1	1.85	1.1
Rockford	......	......	......	0.85	T.
Rockwell City	70	− 2	36.2	1.60	2.0
Ruthven	......	......	......	0.60	2.0
Sac City	69	− 2	38.5	1.18	0.8
St. Charles	73	2	40.8	1.08	1.5
Scranton	72	0	37.7	1.41	T.
Sheldon	68	− 6	36.8	0.56	1.9
Sibley	66[c]	− 5[c]	35.4[c]	0.50	2.5
Sigourney	73	1	41.5	0.96	1.3
Sioux Center	65	− 6	35.4	1.19	5.5
Stockport	......	......	......	1.61	T.
Storm Lake	65	− 5	36.0	0.86	0.3
Thurman	78	4	44.5	1.15	......
Tipton	65	0	40.5	3.25	T.
Villisca	77	2	41.8	0.92	T.
Vinton*[1]	67	− 1	38.0	1.59	T.
Wapello	68	6	41.0	2.39	T.
Washington	......	......	......	1.57	T.
Washta	......	......	......	0.65	T.
Waterloo	68	− 4	37.5	2.29	0.5
Waverly	69	− 5	37.8	2.05	1.7
Westbend	69	− 3	37.2	0.41	0.5
West Union	......	......	......	2.28	1.0
Whitten	68	− 5	37.2	1.71	T.

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Iowa—Cont'd.					
Wilton Junction	67	0	40.0	2.67	T.
Winterset	79	2	41.3	1.05	T.
Woodburn	....	....	....	0.92	T.
Kansas.					
Abilene	80	9	47.0	0.85	T.
Achilles	78	−1	41.2	0.82	T.
Anthony				2.54	T.
Atchison	75	10	44.4	0.68	0.5
Beloit	79	5	45.6	0.52	T.
Burlington	76	11	46.7	2.67	T.
Chanute	79	15	49.6	2.60	T.
Colby	75	3	42.3	0.81	
Columbus	80	18	47.0	5.11	T.
Delphos	83	6	46.0	0.66	T.
Dresden	74	0	42.0	1.18	
Ellinwood	81	6	45.3	1.30	2.0
Emporia	73	12	46.2	2.90	2.8
Englewood	77	11	47.4	1.57	4.0
Eureka	....	....	....	3.68	T.
Eureka Ranch	78	0	44.4	0.73	T.
Fallriver	75	15	47.8	2.70	T.
Farnsworth *1	76	14	43.8	0.80	T.
Fort Leavenworth	75	9	43.2	1.21	T.
Fort Scott	76	15	46.2	3.95	1.0
Frankfort	81	7	45.9	1.89	0.2
Fredonia	75	15	48.4	3.09	
Garden City	78	10	44.5	2.46	2.0
Gove *1	78	10	43.8	0.67	
Grenola	75	15	47.3	2.84	T.
Hanover	80	7	44.4	0.81	
Harrison	78	3	44.2	0.65	0.1
Horton	75	8	44.0	1.14	1.0
Hoxie	75	1	42.4	0.80	T.
Hutchinson	80	7	44.8	2.02	4.0
Independence	75	22	48.8	2.95	T.
Jetmore	77	7	42.9	1.90	2.0
Lakin	77	11	45.1	1.66	4.0
Lawrence	72	10	44.8	2.86	1.5
Lebanon	75	15	43.0	1.00	
Lebo	74	11	45.8	2.47	2.0
Leoti	76	7	42.7	0.92	T.
Little River	82	6	46.5	1.23	2.0
Macksville	79	7	44.8	1.58	2.0
McPherson	82	6	46.5	1.91	2.5
Madison	74	11	46.4	3.22	
Manhattan	81	10	47.0	1.37	0.3
Marion	76	10	47.1	1.45	2.5
Medicine Lodge	80	17	48.7	2.04	T.
Minneapolis	82	6	46.3	1.02	T.
Moran	75	13	47.0	2.35	2.0
Mounthope *1	78	17	46.4	1.63	T.
Ness City	78	10	47.1	1.62	0.5
Newton	78	9	47.6	2.16	5.0
Norwich	79	13	47.6	2.42	T.
Oberlin	....	....	....	1.60	
Olathe	72	10	44.8	2.54	2.0
Osage City	75	11	45.9	2.25	1.0
Oswego	80	17	49.0	5.06	T.
Ottawa	76	11	45.6	2.74	T.
Phillipsburg	77	3	42.8	0.95	T.
Rome	80	17	48.8	2.14	T.
Salina	82	7	46.9	1.05	1.0
Sedan	77	17	48.6	4.69	T.
Seneca	78	7	44.9	1.36	0.5
Toronto	75	13	45.3	3.22	T.
Ulysses	78[j]	6[j]	44.8[j]	2.10	3.0
Valley Falls	73	9	46.2	0.52	0.8
Viroqua	79	6	44.4	2.02	2.0
Wallace	....	....	....	0.49	0.5
Wamego *1	79	9	45.1	1.12	T.
Winfield	78	16	48.6	3.34	
Yates Center	74	15	48.2	2.98	2.0
Kentucky.					
Alpha	78	15	49.3	9.68	5.5
Anchorage	75	11	46.2	2.13	7.0
Berea	73	10	47.0	5.05	11.5
Blandville	72	15	48.0	3.54	0.5
Bowling Green	80	14	50.4	6.18	T.
Burnside	82	13	47.1	6.95	4.5
Carrollton	72	12	45.8	1.26	T.
Catlettsburg	75	9	45.2	3.03	12.0
Centertown	77	14	48.0	3.37	4.0
Earlington	76	15	47.7	3.68	4.0
Edmonton	77	12	48.8	7.03	6.1
Eubank	74	10	47.5	7.10	8.0
Falmouth	....	....	....	2.48	8.0
Fords Ferry	78	15	48.9	3.22	T.
Frankfort	72	12	46.2	3.36	7.0
Franklin	79	16	49.2	5.10	6.0
Georgetown	72	11	45.8		
Greensburg	77	13	45.7	4.80	0.1
Henderson	76	14	47.2	3.30	0.8
Hopkinsville	74	14	49.4	5.93	4.8
Irvington	73	11	46.4	2.80	4.4
Leitchfield	74	12	46.9	3.91	4.2
Loretto	75	7	47.6	3.40	10.1
Manchester	....	11	....	7.55	11.0
Marrowbone	76	13	48.1	7.29	6.0

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Kentucky—Cont'd.					
Maysville	76	10	44.1	3.20	10.1
Mount Sterling	71	8	45.6	4.16	15.5
Owensboro	77	14	49.2	3.47	2.9
Owenton	69	9	43.4	3.26	6.0
Paducah *a*	....	....	....	3.65	2.0
Paducah *b*	79	16	50.7	4.04	2.0
Pikeville	78	11	46.8	6.00	16.5
Richmond	73	11	44.8	4.00	5.0
St. John	74	11	47.2	3.67	8.0
Scott	72	11	44.5	1.65	3.7
Shelby City	73	10	45.6	5.51	13.5
Shelbyville	74	11	46.8	3.71	9.4
Williamsburg	77	12	48.2	6.94	6.0
Louisiana.					
Abbeville	80	30	63.0	2.18	
Alexandria	86	27	59.6	2.66	
Amite	84	27	62.0	4.06	
Baton Rouge	80	39	60.8	4.36	
Burnside	83	28	62.4	4.82	
Calhoun	78	25	54.2	8.64	
Cameron	80	36	62.4	1.49	
Cheneyville	80	28	60.1	3.25	
Clinton	81	27	61.0	4.76	
Collinston	82	26	57.6	11.45	
Covington	85	28	62.9	4.72	
Donaldsonville	88	30	63.8	4.70	
Emilie	80	32	61.8	2.88	
Farmerville	80	21	53.6	14.34	
Franklin	86	30	63.2	4.78	
Grand Coteau	81	30	62.0	2.60	
Hammond	83	28	62.6	4.05	
Houma	86	30	64.0	4.65	
Jeanerette	88	29	65.4	3.14	
Jennings	81	27	60.8	2.39	
Lafayette	80	27	61.6	2.57	
Lake Charles	83	31	61.6	2.37	
Lake Providence	85	27	57.9	12.11	
Lakeside	81	34	62.6	1.35	
Lawrence	83	36	59.8	4.15	
Libertyhill	83	24	58.2	7.39	
Mansfield	83	25	56.3	6.22	
Melville	83	26	61.2	4.40	
Minden	85	28	58.1	5.51	
Monroe	80	31	58.0	8.83	
New Iberia	79[e]	32[e]	63.3[e]	3.70	
Opelousas	81	28	60.5	4.04	
Oxford	79[l]	25[l]	54.7[l]	5.96	
Paincourtville	84	30	61.6	5.30	
Plain Dealing	85	29	56.3	5.74	
Rayne	87	30	63.3	2.73	
Reserve	82	32	63.1	3.35	
Robelin *	82	25	57.0	3.00	
Ruddock	84	34	63.4	1.50	
Ruston	81[e]	27[e]	58.3[e]	9.73	
Schriever	89	28	62.8	4.12	
Southern University	....	....	....	2.42	
Sugar Ex. Station	83	36	62.5	4.16	
Sugartown	86	30	60.4	2.95	
Venice	81	40	63.4	5.66	
Wallace	84	30	63.8	3.15	
White Sulphur Springs	82	26	60.4	4.80	
Maine.					
Bar Harbor	60	7	38.4	14.37	17.5
Belfast	63	7	37.2	12.70	18.0
Bemis	44	8	29.6	4.82	20.0
Calais	54	−1	34.6	10.06	15.0
Carmel	58	2	37.4	10.97	5.0
Cornish	63	15	38.8	8.10	12.8
Fairfield	65	7	37.6	7.76	6.0
Farmington	63	5	37.4	8.43	13.0
Fort Fairfield	55	−5	32.9	2.62	6.0
Gardiner	63	13	39.2	10.33	4.5
Kineo	48	0	32.2	4.73	15.0
Lewiston	67	10	39.0	8.96	13.8
Mayfield	58	9	35.7	9.50	12.0
North Bridgton	65	9	38.0	8.21	14.0
Orono	62	2	36.8	8.89	14.0
Rumford Falls	62	12	36.0	3.12	14.0
Winslow	65[c]	5	37.0	8.90	9.0
Maryland.					
Annapolis	78	25	47.8	3.95	....
Bachmans Valley	63	15	41.4	4.56	10.0
Boettcherville	76	12	43.2	4.80	18.0
Boonsboro	74	14	44.6	3.91	13.0
Cambridge	78	20	48.0	3.82	....
Chase	76	9	44.6	3.96	1.0
Cheltenham	78	17	46.8	2.98	0.5
Chestertown	71	20	45.8	3.50	0.5
Chewsville	80	14	43.8	3.98	15.0
Clearspring	76	15	42.9	5.92	24.0
Coleman	72	19	46.5	4.03	0.5
Collegepark	78	18	46.4	3.54	....
Colora	....	....	....	3.99	6.0
Cumberland *b*	....	....	....	4.69	18.0
Darlington	76	17	45.8	3.77	5.0
Deerpark	68[e]	5[e]	38.0[e]	3.66	30.0
Denton	69	20	45.8	1.99	....
Easton	76	21	46.4	3.63	....

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Maryland—Cont'd.					
Fallston	75	16[e]	43.9	4.52	3.0
Frederick	76	17	46.2	4.30	10.0
Grantsville	69	5	38.3	4.99	21.0
Greatfalls	78	18	45.7	3.78	....
Greenspring Furnace	74[b]	15[e]	42.7[e]	4.04	16.0
Guard	70	9	40.8	3.74	19.0
Hancock	73	11	43.4	4.30	18.0
Harney	....	....	....	4.38	14.0
Jewell	78	18	46.4	2.56	T.
Johns Hopkins Hospital	77	18	46.6	4.26	....
Laurel	77	18	44.2	3.71	4.0
McDonogh	75[g]	8	42.7[d]	2.89	....
Mount St. Marys College	74	17	43.8	5.66	21.0
Newmarket	75	16	45.1	4.21	9.5
Pocomoke	72	21	47.5	1.82	....
Princess Anne	70	20	46.8	1.96	T.
Queenstown	73	22	47.2	3.33	0.5
Sharpsburg	75	12	44.3	4.16	14.0
Smithsburg *b*	67	13	42.1	3.05	11.5
Solomons	75	20	46.2	2.69	T.
Sudlersville	71	20	46.4	3.30	....
Sunnyside	68	3	37.6	5.55	20.2
Takoma Park	79	17	45.4	4.55	....
Taneytown	73	16	43.8	4.82	19.0
Van Bibber	72	18	45.4	4.79	....
Westernport	68	13	41.8	3.89	15.0
Woodstock	74	17	46.8	3.82	2.5
Massachusetts.					
Amherst	65	15	40.9	5.47	9.5
Bedford	65	18	41.4	5.55	10.0
Bluehill (summit)	66	22	41.2	6.75	11.0
Cambridge	68	19	43.0	6.40	....
Chestnuthill	68	18	43.4	5.27	11.0
Cohasset	....	....	....	6.17	6.0
Concord	68	15	41.2	5.02	7.6
East Templeton *1	61	20	37.9	3.81	10.0
Fallriver	64	25	41.8	5.50	3.5
Fitchburg *a* *1	63	23	39.6	5.25	9.5
Fitchburg *b*	66	22	41.3	5.23	9.0
Framingham	68	13	43.5	6.45	....
Groton	65	18	40.6	4.53	10.5
Hyannis	....	....	....	6.61	0.5
Jefferson	....	....	....	5.36	11.0
Lawrence	64	17	42.3	6.66	11.0
Leominster	....	....	....	5.13	9.9
Lowell *a*	68	19	43.1	5.28	....
Lowell *b*	66	16	42.6	....	....
Ludlow Center	63	6	37.7	4.30	....
Middleboro	65	16	41.0	5.82	4.2
Monson	65	11	40.6	5.46	10.0
New Bedford *a*	63	20	40.6	6.91	1.0
Plymouth *1	65	27	41.7	7.82	5.0
Princeton	....	....	....	4.84	11.0
Provincetown	64	27	41.8	6.35	2.0
Somerset *1	76	22	43.0	6.44	6.5
Springfield Armory	66	15	41.8	4.74	7.0
Sterling	....	....	....	5.12	7.0
Taunton *c*	65	13	40.6	5.72	....
Webster	....	....	....	6.63	12.2
Westboro	66	23	43.6	4.02	9.0
Weston	65	14	41.5	5.35	10.5
Williamstown	60	11	38.2	3.56	13.5
Winchendon	....	....	....	4.88	16.0
Worcester	68	19	41.9	3.75	10.5
Michigan.					
Adrian	66	10	39.8	2.54	0.5
Agricultural College	69	5	38.0	3.16	0.5
Alma	68	8	38.1	4.09	T.
Ann Arbor	68	8	38.8	2.69	T.
Annpere	65	8	38.5	1.30	2.0
Arbela	65	6	37.8	3.77	1.0
Baldwin	65	1	40.2	4.43	2.0
Ball Mountain	67	7	38.7	1.83	1.5
Baraga	59[d]	−4[d]	30.4[d]	0.40	4.0
Battlecreek	68	5	39.6	3.09	1.0
Bay City	68	6	38.2	6.09	1.0
Benzonia	64	6	36.7	3.19	10.0
Berlin	68	8	37.0	2.43	0.7
Berrien Springs	69	8	39.9	4.32	7.5
Big Rapids	65	1	36.0	4.39	1.0
Birmingham	67[e]	10[e]	40.5[e]	2.42	0.5
Boon	60	−1	33.6	3.99	17.7
Calumet	55	−4	33.0	1.65	12.0
Cassopolis	68	3	38.6	4.40	2.0
Charlevoix	61	2	34.6	1.45	1.8
Charlotte	70	6	38.5	4.15	5.0
Chatham	63	2	31.4	1.04	6.0
Cheboygan	57	−3	33.2	1.45	3.5
Clinton	68	8	39.9	3.04	T.
Coldwater	68	5	41.2	2.91	0.0
Deerpark	58	6	31.8	0.64	T.
Detour	58	−5	32.3	1.33	7.0
Dundee	69	9	40.4	2.85	....
Eagle Harbor	60	0	33.0	1.20	1.0
East Tawas	63	1	34.7	3.10	0.5
Eloise	69	7	40.5	....	....
Ewen	60	....	....	0.70	7.0
Fennville	65	7	38.9	1.27	0.4

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
Fitchburg	65	5	38.7	3.69	8.0
Flint	68	8	37.4	3.28	3.2
Frankfort	.....	11	.....	1.10	1.0
Gaylord	65	−7	34.8	1.70	2.0
Grand Rapids	65	7	39.0	4.48	3.0
Grape	70	9	39.8	3.30	2.0
Grayling	68	1	36.0	2.05	9.0
Hanover	68	6	38.5	3.90	4.0
Harbor Beach	70	7	35.8	4.32	0.7
Harrison	61[l]	3	36.1[c]	4.19	1.9
Harrisville	70	0	34.5	3.43	3.3
Hart	62	6	37.6	3.85	11.0
Hastings	69	5	38.5	4.12	4.6
Hayes	72	4	36.8	5.07	4.0
Highland Station	.....	.....	.....	3.06	3.2
Hillsdale	67	6	38.7	3.52	2.0
Humboldt	58	−7	29.7	0.45	3.5
Ionia	.....	.....	.....	1.31	T.
Iron Mountain	62	0	35.0	1.09	3.9
Ironwood	57	−6	33.1	1.08	9.0
Ishpeming	59	−2	32.0	1.30	3.0
Ivan	64	3	34.8	3.18	5.0
Jackson	68	7	40.7	3.07	4.0
Jeddo	68	8	37.4	2.42	0.8
Kalamazoo	67	8	38.7	2.24	0.5
Lake City	65	5	35.8	0.90	8.0
Lansing	69	5	37.8	4.06	4.3
Lapeer	69[b]	7[c]	38.5[c]	.....	.....
Lathrop	55	10	35.2	0.90	1.0
Lincoln	67	−2	34.0	1.19	0.5
Ludington	66	6	35.7	2.11	8.6
Mackinac Island	58	−5	32.8	1.66	6.0
Mackinaw	60	−3	32.8	1.29	2.0
Mancelona	65	0	36.1	1.24	5.0
Manistee	64	7	37.0	4.51	4.0
Manistique	54[c]	4[c]	32.6[c]	1.01	T.
Menominee	65	0	33.2	0.46	T.
Midland	68	7	38.8	3.66	4.0
Mio	65	−3	35.0	3.86	4.5
Mount Clemens	.....	.....	.....	1.17	T.
Mount Pleasant	67	7	39.0	4.14	T.
Muskegon	64	8	37.6	3.83	1.5
Newberry	59	2	32.4	0.01	T.
North Marshall[c]	67	6	38.1	1.80	2.0
Old Mission	63	6	35.6	2.72	2.2
Olivet	64	6	38.2	3.25	4.4
Omer	63	4	35.1	2.65	3.0
Onaway	66	−4	34.6	0.89	T.
Ontonagon	63	−2	32.2	1.28	9.8
Ovid	68	6	38.2	3.57	2.0
Owosso	74	10	38.3	4.09	0.0
Petoskey	63	−3	34.0	0.85	6.0
Plymouth	68	12	38.0	.....	1.0
Pontiac	68	7	39.6	1.73	T.
Port Austin	62	6	36.6	1.60	0.0
Reed City	64	2	37.1	3.79	2.5
Roscommon	.....	.....	.....	1.55	3.5
Saginaw	69	7	38.4	4.70	2.2
St. Ignace	58	8	33.6	1.52	2.5
St. Johns	68	6	39.0	2.54	3.5
St. Joseph	67	10	39.5	4.24	2.3
Sidnaw	75	10	35.0	.....	.....
Somerset[j]	66	21	39.7	1.64	0.0
South Haven	65	7	35.8	4.30	1.0
Thomaston	58	−7	32.6	0.70	7.0
Thornville	66	9	38.0	1.84	2.5
Traverse City	69	3	34.6	1.64	7.0
Vassar	56	8	32.3	6.22	T.
Wasepi	69	8	39.3	3.16	2.0
Waverly	65	6	38.0	4.12	1.0
Webberville	69	6	38.6	3.27	4.0
West Branch	65	2	36.6	3.11	1.5
Wetmore	46	2	28.2	.....	.....
Whitecloud	67	3	37.8	3.20	5.0
Whitefish Point	49	1	29.8	0.68	T.
Ypsilanti	67	6	38.5	2.23	1.0
Minnesota.					
Ada	56	−10	30.2	1.47	0.5
Albert Lea	66	−8	34.6	0.20	1.0
Alexandria	63	−12	33.8	0.46	T.
Ashby	60	−11	33.4	1.13	1.8
Beardsley	65	−10	33.6	4.85	5.0
Beaulieu	59	−13	31.2	0.85	T.
Bemidji	56	−12	31.6	0.97	2.3
Bird Island	70	−8	34.4	0.36	3.0
Blooming Prairie	63	−8	35.4	0.10	T.
Brainerd	60	−10	32.5	0.61	1.0
Caledonia	61	−8	35.5	2.11	3.0
Collegeville	60	−9	34.0	0.47	1.8
Crookston	55	−12	31.2	1.91	2.0
Currie[c]	65	−7	34.6	.....	.....
Deephaven	.....	.....	.....	0.13	1.0
Detroit City	56	−15	31.4	1.54	2.0
Faribault	65	−8	35.4	0.66	0.8
Farmington	64	−8	35.8	0.81	4.0
Fergus Falls	61	−12	32.8	1.80	4.0
Glencoe	62	−8	34.6	0.50	2.0
Grand Meadow	62	−8	35.2	1.29	1.0
Minnesota—Cont'd.					
Hallock	54	−18	28.6	2.90	18.3
Hovland	.....	.....	.....	1.03	2.5
Lakeside	64	−9	35.6	0.60	2.0
Lake Winnibigoshish	55	−11	30.2	0.51	2.0
Leech	59	−10	30.9	1.01	0.8
Long Prairie	60	−11	33.2	1.15	1.5
Luverne	72	−6	35.2	0.40	1.5
Lynd	65	−8	34.7	0.55	2.0
Mapleplain	63	−9	35.2	0.52	1.8
Milan	68	−9	33.8	1.15	5.0
Minneapolis b[1]	62[a]	−7	34.6	0.27	1.0
Montevideo	62	−10	33.0	1.09	6.5
Morris	66	−10	34.0	0.97	1.0
Mount Iron	58	−15	31.5	1.01	2.5
New London	61	−8	33.8	0.41	0.5
New Richland	63	−8	36.4	0.16	1.0
New Ulm	65	−7	35.7	0.41	0.8
Park Rapids	55	−13	31.2	1.12	3.3
Pine River	56	−15	31.8	1.09	.....
Pipestone	65	−8	33.9	0.51	1.5
Pleasant Mounds	66	−5	36.5	0.43	1.5
Pokegama Falls	69	−17	30.7	1.20	0.9
Redwing a	.....	.....	.....	0.90	1.0
Redwing b	64	−6	36.6	0.65	1.5
Reeds	.....	.....	.....	0.37	1.5
Rolling Green	68	−6	36.5	0.35	2.0
St. Charles	63	2	36.0	0.70	T.
St. Cloud	62	−9	36.3	0.35	T.
St. Peter	70	−10	36.2	0.10	T.
Sandy Lake Dam	58	−12	30.3	0.82	3.0
Shakopee	65	−6	36.2	0.47	1.2
Tower	60	−20	29.5	0.52	2.2
Two Harbors	59	−9	27.4	0.39	1.0
Wabasha	66	−5	38.0	0.85	2.0
Willmar	63	−10	33.6	0.56	T.
Willow River	62	−9	32.3	0.55	2.0
Winnebago City	65	−7	35.6	0.97	2.5
Winona	65	−4	38.1	0.89	0.9
Worthington	62	−6	34.8	0.70	2.4
Zumbrota[1]	62[a]	−14	37.2	.....	.....
Mississippi.					
Aberdeen	75	25	54.0	9.57	
Agricultural College	77	27	54.8	15.34	
Austin	82	25	54.6	9.49	
Batesville	78	25	54.2	12.79	
Bay St. Louis	80	31	61.6	4.78	
Biloxi	79	34	62.4	5.00	
Booneville	73	22	51.1	10.98	T.
Brookhaven	82	26	60.6	11.25	
Canton	80	27	57.2	13.84	
Columbus a	.....	.....	.....	10.10	
Columbus b	77	27	55.0	9.18	
Corinth	81[h]	21	51.0[d]	12.14	
Crystalsprings	80	28	57.4	6.89	
Duck Hill	80	23	55.6	10.30	
Fayette	78	27	58.6	7.57	
Fayette (near) *[1]	78	32	61.5	6.83	
Greenville a	77	31	56.4	7.89	
Greenville b	84	28	56.4	7.26	
Greenwood	81	28	58.4	11.30	
Hattiesburg	82	29	62.1	7.04	
Hazlehurst	82	25	57.2	7.38	
Hernando	75	25	52.6	6.61	
Holly Springs	75	24	51.4	9.08	
Indianola	80	28	56.6	9.59	
Jackson	81	26	58.7	10.72	
Lake	77	25	54.9	11.13	
Laurel	80	28	61.3	8.51	
Leakesville	84	26	58.8	7.37	
Louisville	79	25	55.2	11.19	
Macon	78	29	56.3	10.32	
Magnolia	80	26	59.8	5.70	
Natchez	82	28	61.8	5.20	
Nittayuma	79	29	55.6	10.84	
Okolona	78	25	54.2	9.37	
Palo Alto	79	26	55.2	9.25	
Pearlington	83	27	63.0	4.53	
Pittsboro	79	24	54.4	9.67	
Pontotoc	76	24	53.7	7.26	T.
Port Gibson	81	26	60.2	9.86	
Ripley	78	19	53.6	14.53	
Shoccoe	.....	.....	.....	9.27	
Stonington *[1]	80	28	58.9	7.55	
Suffolk	79	24	59.4	4.61	
Swartwout	78	30	61.7	5.45	
Thornton	80	34	57.9	10.46	
Tupelo	.....	.....	.....	9.84	
University	77	25	54.4	11.86	T.
Walnutgrove	.....	26[c]	.....	13.41	
Watervalley	79	25	56.7	12.33	T.
Waynesboro	85	26	59.8	8.09	
Woodville	77	29	60.4	3.84	
Yazoo City	81	28	56.8	13.20	
Missouri.					
Appleton City	78	14	48.2	4.97	1.5
Arthur	73	15	46.7	4.53	T.
Avalon	72	10	44.8	2.82	T.
Bagnall	.....	.....	.....	3.98	
Missouri—Cont'd.					
Bethany	72	7	42.3	0.69	T.
Birchtree	75	15	48.0	3.63	
Boonville	.....	.....	.....	4.50	2.2
Brunswick	72	11	42.8	3.73	1.0
Conception	72	1[c]	42.8	0.70	1.0
Cowgill *[5]	76	10	45.1	2.63	0.5
Darksville	73	10	43.2	3.65	0.5
Dean	82	15	48.4	6.85	
Desoto	85	14	48.3	4.02	T.
Downing	.....	.....	.....	1.45	T.
Edgehill *[6]	68	12	43.7	4.34	T.
Eightmile *[2]	.....	11	40.4	3.45	3.0
Eldon	74	10	46.4	2.27[a]	1.0
Fairport	.....	.....	.....	1.33	T.
Fayette	75	11	43.8	3.91	2.5
Fulton	74	13	45.4	2.91	T.
Galena	.....	.....	.....	5.93	T.
Gallatin *[1]	72	8	44.2	2.19	T.
Gayoso	71	20	50.8	3.91	T.
Glasgow	72	11	43.8	3.30	5.0
Gorin	.....	.....	.....	1.51	T.
Harrisonville	74	12	43.8	3.50	2.0
Hazlehurst	.....	.....	.....	2.01	0.3
Hermann	.....	.....	.....	3.15	
Houston	78	15	46.8	4.66	T.
Ironton	76	15	46.8	5.46	T.
Jackson	77	16	49.4	3.06	
Jefferson City	76	16	45.4	4.26	
Joplin	78	18	49.4	4.85	T.
Kidder	71	7	42.2	2.13	0.9
Koshkonong	76	16	49.1	3.60	
Lamar	78	17	48.6	4.18	0.6
Lamonte	.....	.....	.....	2.62	3.5
Lebanon	77	16	46.7	4.69	0.2
Lexington	74	11	45.1	3.95	5.0
Liberty	73	10	43.7	2.22	0.5
Louisiana	75	12	45.0	3.42	0.5
Macon	74	9	43.2	2.69	1.0
Marblehill	74	15	47.2	3.03	
Marshall	73	12	44.6	3.88	3.8
Maryville	71	1	40.0	0.95	1.5
Mexico	80	13	45.1	3.36	0.4
Miami *[5]	71	12	43.7	4.64	5.5
Mineralspring	75[c]	14[c]	46.8[c]	4.93	
Monroe City	75	8	42.8	3.51	0.6
Montreal	74	9	45.5	4.07	0.2
Mountaingrove	73	14	45.8	4.78	T.
Mount Vernon	78	16	47.2	7.67	T.
Neosho	76	16	48.2	5.27	
Nevada	.....	.....	.....	4.70	T.
New Haven	75	17	46.7	4.27	T.
New Madrid b	.....	.....	.....	3.23	
New Palestine	72	14	46.4	4.08	3.2
Oakfield	74	13	46.0	3.99	0.3
Olden	76	16	48.0	4.81	
Oregon	76	8	43.8	0.87	1.3
Palmyra *[5]	72	14	44.0	3.02	1.0
Phillipsburg	.....	.....	.....	4.55	
Pine Hill	.....	.....	.....	4.44	T.
Poplarbluff	76	18	50.4	3.04	
Potosi	74	7	45.4	5.04	T.
Princeton	71	5	42.1	1.37	
Richmond	70	10	43.6	3.86	3.0
Rockport	.....	.....	.....	1.57	T.
Rolla	.....	.....	.....	4.15	0.6
St. Charles	74	13	45.4	3.77	T.
St. Joseph	.....	.....	.....	0.46	T.
Sarcoxie *[3]	.....	18	42.0	5.31	T.
Sedalia	73	13	45.2	3.49	2.0
Seymour	72	13	45.5	4.69	
Shelbina	.....	.....	.....	3.61	T.
Sikeston	73	18	49.4	2.68	0.5
Steffenville	74	9	43.8	2.74	1.0
Sublett	74	6	41.5	2.05	1.0
Trenton	68	9	42.8	1.49	0.5
Unionville	74	5	42.0	1.82	1.5
Vichy	74	10	45.4	5.19	0.7
Warrensburg	74	13	45.0	4.93	5.0
Warrenton	75	12	43.1	3.99	T.
Wheatland	.....	.....	.....	5.85	1.5
Willowsprings	78	14	47.8	3.97	T.
Zeitonia	75	.....	.....	4.67	.....
Montana.					
Adel	52	−15	28.5	1.03	10.3
Anaconda	50	5	29.8	1.03	8.5
Augusta	55	−16	29.2	0.76	14.0
Avon	48	−4	28.8	.....	.....
Boulder	50	−5	29.4	0.39	4.0
Bozeman	50	−1	29.8	0.77	.....
Butte	50	−8	30.5	0.75	7.5
Canyon Ferry	56	−4	34.2	0.48	3.5
Chester	55	5	29.8	T.	T.
Columbia Falls	51	1	33.5	0.30	2.0
Crow Agency	62	−2	34.7	1.22	9.0
Culbertson	52	−10	27.6	0.82	8.5
Deerlodge	51	3	30.8	.....	.....
Dillon	51	2	31.0	0.96	8.5
Fort Benton	52	−10	32.5	T.	T.

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Montana—Cont'd.					
Fort Logan	48	−10	28.4	2.80	28.0
Glasgow	55	−8	30.2	1.24	.....
Glendive	58	−16	30.3	2.90	19.0
Greatfalls	56	−6	35.0	0.19	1.6
Kipp	55	−20	26.0	0.57	5.7
Livingston	58	0	33.0	0.18	1.8
Manhattan	55	5	34.4	0.55	5.5
Marysville	48	−12	27.2	1.15	11.5
Ovando	49	−6	25.8	0.61	3.7
Parrot	51	1	32.6	0.09	0.9
Plains	57	15	35.9	0.10	1.0
Poplar	54	−10	28.4	0.56	1.5
Ridgelawn	51	−6	28.3	1.17	7.0
St. Pauls	55	−14	30.8	0.14	0.5
St. Peter	50	−20	29.2	0.56	11.0
Springbrook	58	−14	28.5	2.76	20.3
Toston	56	−2	33.1		
Townsend	57	−4	33.0	0.72	7.2
Troy	61	13	36.5	1.28	5.0
Twin Bridges	49[e]	4[e]	30.2[e]	0.22	0.2
Twodot	54	−5	28.4	1.45	14.5
Utica	53	−12	30.4	0.45	5.0
Wibaux	54	−22	26.8	......	.....
Yale	55	−8	27.5	1.75	17.5
Nebraska.					
Agate				1.90	5.5
Agee*[1]	70	−4	33.4	2.03	4.3
Albion	70	0	39.2	0.97	
Alliance	68	0	40.2	1.41	6.2
Alma	78	2	43.8	0.95	
Ames	71	3	42.4	0.89	0.2
Ansley	72	−3	35.3	0.88	
Arapahoe*[1]	72	1	41.8	0.59	0.2
Arborville*[1]	72	0	39.1	1.05	1.5
Arcadia				1.60	1.0
Ashland *a*	74	4	43.2	0.40	1.0
Ashland *b**[1]	72	5	41.9	0.71	T.
Ashton				1.88	0.5
Auburn	77	7	44.5	1.09	1.0
Aurora	68	−3	40.4	1.42	0.4
Bartley				1.21	T.
Beatrice	80	5	43.6	0.61	T.
Beaver	75	0	42.2	0.49	T.
Bellevue				0.90	0.5
Benedict				0.68	T.
Benkleman				1.00	
Blair	72	2	39.2	1.25	0.8
Bluehill*[1]	65	0	39.9	0.80	T.
Bradshaw				1.41	T.
Bridgeport	74	5	38.6	1.33	0.3
Brokenbow	71	−3	38.2	0.76	T.
Burchard				0.60	
Burwell				1.75	T.
Callaway	70	−2	38.5	1.30	
Central City				1.10	T.
Chester				0.59	T.
Columbus	70	4	39.6	0.67	T.
Crete	75	4	43.8	0.40	
Culbertson				1.25	
Curtis	71[1]	−1[1]	41.1[1]	2.00	
Dannebrog				1.77	
Dawson	78	7	45.2	1.25	T.
Edgar*[5]				0.90	T.
Ericson				2.30	0.5
Ewing				1.24	T.
Fairbury	81[e]	4[e]	44.8[e]	0.42	T.
Fairmont	72	−1	40.8	0.30	T.
Fort Robinson	65	0	35.8	1.91	5.5
Franklin				1.15	
Fremont	71	2	41.3	0.86	0.6
Fullerton				1.07	0.7
Geneva	76	3	40.8	0.76	0.6
Genoa	69	2	40.0	1.04	T.
Gering	66	5	37.4	1.26	1.0
Gordon				0.72	7.0
Gosper				0.73	
Gothenburg		−1		1.88	
Grand Island *b*	70	1	41.6	1.17	1.2
Grand Island *c*	69	2	40.1	1.03	.....
Greeley				2.30	0.5
Guide Rock				1.00	1.0
Haigler				1.12	
Hartington	74	−5	35.8	1.49	5.0
Harvard	69	2	40.9	1.00	T.
Hastings*[1]	70	0	40.9	1.29	1.5
Hayes Center				1.33	
Hay Springs	60	3	32.0	3.09	7.5
Hebron	81	5	44.1	0.71	
Hickman				0.85	
Holbrook				0.50	0.5
Holdrege	72	−6	40.6	1.40	
Hooper*[1]	69	3	39.3	1.04	0.3
Imperial	73[1]	−2[1]	42.0[1]	1.65	T.
Johnstown				0.74	
Kearney	71[e]	16[e]	41.3[e]	2.09	T.
Kennedy	72	−10	38.0	1.27	T.
Kimball	63	9	35.2	1.20	5.0
Kirkwood*[1]	70	−5	33.3	0.60	1.1

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Nebraska—Cont'd.					
Laclede	68	2	41.1	1.10	0.3
Lexington	70	−1	39.0	0.86	0.5
Lodgepole	70	4	36.6	......	.....
Loup	70	0	39.8	2.37	
Lynch	72	−3	37.0	1.79	4.0
Lyons				0.78	0.4
McCook*[1]	66	10	41.6	1.02	
McCool				0.38	
Madison	67	0	39.8	0.65	0.5
Madrid	76	−12	38.8	1.00	
Marquette				1.14	0.5
Mason City				1.00	
Minden *a*	71	1	40.7	1.77	0.6
Monroe				0.66	1.0
Nebraska City *b*	72	8	41.9	1.52	0.7
Nemaha*[1]	76	10	45.7	1.00	0.5
Nesbit	71	−9	38.0	1.40	T.
Norfolk	70	−2	38.7	0.94	3.5
North Loup	71	0	39.4	2.38	0.5
Oakdale	67	−1	36.9	1.23	3.4
Odell				0.39	T.
O'Neill	71	−4	36.0	1.94	
Ord				2.18	
Palmer				1.50	1.0
Palmyra*[1]	72	4	41.1	1.24	.....
Plattsmouth *a*				1.39	1.5
Plattsmouth *b*	73	5	41.5	1.38	1.5
Ravenna *a*	70	0	39.8	1.51	0.5
Ravenna *b*				1.29	T.
Redcloud *b*	78	6	45.3	0.89	T.
Republican*[1]	84	0	44.2	1.40	
Rulo				0.79	T.
St. Libory				2.08	2.0
St. Paul	70	1	42.1	1.88	1.5
Salem*[1]	70	6	43.1	1.67	T.
Santee	74	−3	39.0	1.18	7.2
Schuyler				0.90	3.0
Seneca*[1]	65	−2	35.8	0.36	T.
Seward	75	4	40.3	0.70	T.
Smithfield				0.68	
Spragg				0.52	2.5
Stanton	67	0	40.0	0.81	3.5
State Farm	75	5	43.4	0.35	T.
Strang*[1]	75	4	44.6	......	T.
Stratton				0.74	
Superior	77	3	41.2	0.62	T.
Syracuse				1.45	3.0
Tablerock				0.86	1.0
Tecumseh *b*	79	6	42.2	......	.....
Tecumseh *c*				0.75	T.
Tekamah	73	2	42.0	1.05	1.0
Turlington	75	5	42.8	0.76	0.8
Wakefield	68	−2	38.2	0.47	1.6
Wallace				1.05	
Wauneta				0.75	
Weeping Water				1.84	4.2
Westpoint	65	0	38.6	0.57	1.5
Wilber*[1]	78	6	42.3	0.50	T.
Willard				0.97	T.
Wilsonville				0.59	0.7
Winnebago				0.18	1.0
Wisner				0.49	1.0
Wymore				0.53	T.
York	70	2	43.5	0.35	T.
Nevada.					
Amos	60	18	36.3	0.69	
Austin	53	10	30.4	1.51	.....
Battle Mountain	......	14	......	0.85	8.5
Beowawe*[1]	68	20	38.6	0.90	9.0
Candelaria	69	14	37.3	0.45	4.5
Carlin*[1]	50	10	36.0	0.40	4.0
Carson City	64	1	35.5	1.66	26.0
Cranes Ranch				1.61	14.2
Elko (near)	60	8	35.9	3.75	35.5
Ely	57	0	29.6	2.25	22.5
Eureka	51	9	29.2	5.40	54.0
Golconda*[1]	53	20	38.0	0.70	7.0
Halleck*[1]	50	12	32.7	0.95	9.5
Hamilton	59	5	25.8	4.15	41.5
Hawthorne	63	20	41.8	0.00	
Humboldt	64	14	37.6	0.68	6.0
Lee				2.97	37.5
Lewers Ranch	63	10	35.4	3.33	26.5
Lovelocks *a*				0.13	1.3
Martins	68	7	38.3	1.07	9.5
Mill City*[1]	60	20	38.2	0.35	3.5
Monitor Mill	50	3	26.8	2.30	18.2
Owyhee	53	10	31.5	0.77	10.8
Palisade*[1]	55	9	33.0	1.85	18.5
Palmetto	59	2	33.5	2.90	29.0
Potts	55	8	32.8	2.62	27.5
Reno State University	61	7	33.6	1.73	15.5
Silverpeak	63	17	39.6	0.30	0.5
Sodaville	65	20	40.5	0.15	T.
Tecoma*[5]	55	30	44.2	0.60	6.0
Toano*[5]	52	22	33.0	1.15	11.5
Tybo	59	9	32.7	1.71	21.0
Verdi*[5]	58	12	36.2	T.	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	Ins.	Ins.
Nevada—Cont'd.					
Wabuska	68	23	40.6	0.40	4.0
Wadsworth	66	18	39.4	0.70	7.0
Wells*[1]	54	18	33.1	2.20	22.0
Wood	61	4	30.8	1.25	15.5
New Hampshire.					
Berlin Mills	64	−6	35.6	5.03	10.0
Bethlehem	64	9	36.1	4.96	19.5
Brookline*[1]	68	15	40.4	4.80	10.2
Chatham	64	9	37.1	7.10	10.0
Concord	63	9	39.3	5.52	15.0
Durham	66	17	41.6	7.25	7.0
Franklin Falls	60	12	38.0	6.00	12.0
Grafton	64	0	39.0	6.49	10.0
Hanover	60	13	37.2	3.80	12.8
Keene	64	6	38.9	3.86	11.5
Littleton	65	10	37.6	3.54	14.0
Nashua	68	10	41.6	5.32	11.0
Newton	65	13	40.4	5.00	8.0
Peterboro	65	3	38.0	4.95	2.8
Plymouth	62	11	37.6	4.37	11.0
Sanbornton	61	10	37.9	4.68	13.0
Stratford	65	1	36.8	3.79	9.0
New Jersey.					
Asbury Park	67	20	42.6	4.84	2.8
Bayonne	70	22	44.0	4.60	7.7
Belvidere	73	11	44.2	4.45	10.5
Bergen Point	68	22	43.5	3.95	10.7
Beverly	77	19	45.8	3.75	6.3
Blairstown	72	8	41.8	4.16	11.0
Bridgeton	75	20	46.6	4.42	T.
Camden	75	21	46.6	4.09	3.5
Cape May C. H	69	20	44.2	4.47	T.
Charlotteburg	68	12	40.8	4.40	5.0
Chester	69	15	41.2	5.60	10.0
Clayton	73	19	45.0	4.27	2.0
College Farm	71	20	44.6	3.79	7.5
Dover	69	15	41.3	5.05	10.0
Egg Harbor City	68	18	44.2	4.38	T.
Elizabeth	71	21	44.6	4.46	T.
Englewood	67	20	44.0	4.68	7.0
Flemington	73	10	44.2	4.20	7.0
Freehold	68	14	43.4	4.47	1.0
Friesburg	76	19	44.8	4.11	1.5
Hanover	67	20	43.4	4.80	5.0
Hightstown	72	20	45.6	3.33	5.0
Imlaystown	74	16	45.0	4.44	4.5
Indian Mills	75	18	45.8	4.22	3.0
Lakewood	70	19	45.0	3.92	1.5
Lambertville	74	16	44.6	4.46	9.5
Layton	72	0	40.2	3.36	11.0
Moorestown	75	19	45.3	4.22	5.1
Mount Pleasant				3.70	T.
Newark	68	22	42.8	4.94	7.0
New Brunswick	72	19	46.0	4.83	6.7
New Egypt				3.32	4.0
Newton	73	14	41.6	3.96	10.0
Oceanic	70	22	43.6	5.01	5.2
Paterson	71	21	45.2	5.79	8.0
Plainfield	71	18	43.8	4.66	12.6
Rancocas				3.65	4.9
Ringwood	67	7	41.4	6.09	8.5
Rivervale	67	8	42.4	7.20	13.0
Roseland	69	18	41.8	4.79	5.5
Salem	77	19	46.2	3.84	T.
Somerville	75	13	44.8	4.49	10.0
South Orange	70	20	42.8	4.52	8.0
Sussex	71	13	42.0	3.64	10.0
Three Bridges				3.70	9.0
Trenton	70	22	45.9	3.40	0.4
Tuckerton	66	19	43.7	3.81	T.
Vineland	70	18	45.3	4.45	0.2
Woodbine	68	18	44.0	5.33	
Woodstown				4.06	
New Mexico.					
Alamagordo	75	22	49.2	0.22	T.
Albert	73	15	45.3	0.24	1.0
Albuquerque	69	18	43.0	T.	T.
Alma	71	16	43.8	0.38	
Arabela	70	19	45.6	0.25	T.
Bellranch				0.10	1.0
Bluewater	65	7	34.8	0.60	5.0
Cambray				0.05	
Carlsbad	85	22	54.6	0.22	
Cloudcroft	50	6	30.0	1.45	14.5
Deming				T.	
East Lasvegas	58	17	39.0	T.	
Engle	70	16	45.0	0.03	0.3
Folsom	64	0	36.8	1.62	13.0
Fort Bayard	69	18	44.0	0.04	T.
Fort Stanton	66	15	40.5	0.22	0.2
Fort Union	68	8	35.5	0.60	6.0
Fort Wingate	60	12	35.2	1.04	10.4
Gage				0.00	
Galisteo	60	16	36.4	0.05	0.5
Gallinas Spring	68	12	43.1	0.02	
Horse Springs	66	8	36.4	0.31	2.7
Las Vegas	62	9	38.1	0.01	T.
Lordsburg				T.	T.

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
New Mexico—Cont'd.	°	°	°	Ins.	Ins.
Los Lunas	71	18	43.6	0.00	
Lower Penasco	69	20	44.4	0.20	......
Mesilla Park	76	16	50.0	0.05	0.5
Olio	70	6	38.5	T.	T.
Raton	63	8	36.6	1.50	10.0
Roswell	80	18	49.7	0.83	T.
San Marcial	76[1]	18	49.2[f]	0.00	
Socorro	72	22	47.1	T.	T.
Strauss	......	......	......	T.	T.
Taos	60	2	35.6	0.97	13.0
Winsors Ranch	55	−1	29.6	0.98	12.0
Woodbury	65	10	39.8	0.22	
New York.					
Adams	......	......	......	4.30	4.0
Addison	69	9	39.6	2.57	6.0
Adirondack Lodge	52	3	32.0	9.40	13.0
Akron	......	......	......	1.89	......
Alden	69	9	38.2	1.46	5.0
Angelica	65	9	37.7	2.53	1.5
Appleton	65	17	38.6	1.31	......
Athens	......	......	......	5.60	11.0
Atlanta	63	11	37.4	2.27	1.0
Auburn	66	15	39.5	1.64	1.0
Avon	66	12	38.6	1.58	T.
Axton	62	−2	33.0	4.68	8.0
Baldwinsville	66	16	38.9	3.07	1.0
Bedford	69	13	41.4	4.33	3.0
Blue Mountain Lake	......	......	......	4.35	4.0
Bolivar	64	7	36.4	2.11	3.5
Bouckville	65	10	36.8	3.70	13.0
Boyds Corners	......	......	......	7.49	......
Brockport	67	15	38.2	1.84	2.0
Caldwell	59	10	36.8	5.92	21.0
Cannan Four Corners	61	10	37.6	3.47	9.0
Canajoharie	67	7	36.6	4.04	22.2
Canton	61	10	36.0	2.67	1.0
Carmel	64	10	40.6	5.93	8.5
Carvers Falls	63	11	35.2	5.04	11.0
Catskill	62	18	40.2	5.73	9.5
Cedarhill	63	16	39.6	3.25	3.2
Cooperstown	65	12	35.4	3.70	10.5
Cortland	69	10	36.8	3.20	4.0
Cutchogue	64	22	42.2	6.74	11.0
Dekalb Junction	......	......	......	3.91	3.0
Easton	......	......	......	3.38	9.0
Elba	62	11	37.3	1.52	4.0
Elmira	68	13	40.4	2.63	8.0
Fayetteville	71	14	39.0	3.02	8.0
Franklinville	65	7	36.3	1.92	1.6
Gabriels	64	2	33.3	3.98	9.0
Gansevoort	......	......	......	6.28	15.0
Glens Falls	60	17	39.4	6.47	12.5
Gloversville	57	14	37.0	3.94	17.3
Greenwich	61[e]	12[e]	39.2[e]	5.95	7.5
Griffin Corners	63	5	36.4	3.39	9.5
Haskinville	......	......	......	1.24	......
Hemlock	59	14	37.5	1.53	T.
Honeymead Brook	66	11	40.1	3.96	8.2
Humphrey	63	5	35.0	2.55	5.8
Indian Lake	57	5	33.5	1.65	6.5
Ithaca	67	15	38.3	3.04	9.7
Jamestown	69	8	40.2	1.90	3.6
Jay	66	11	37.2	1.93	0.5
Keene Valley	65	10	35.8	6.58	8.0
King Ferry	......	......	......	3.12	7.4
Littlefalls, City Res	66	12	36.6	3.23	5.0
Lockport[d]	66	15	40.7	1.21	1.5
Lowville	61	10	35.4	4.80	1.0
Lyndonville	......	......	......	0.90	......
Lyons	65	11	39.0	2.05	1.0
Meredith	60	8	33.6	4.14	7.5
Middletown	68	19	40.4	3.72	8.0
Mohonk Lake	62	15	38.3	6.32	10.0
Moira	65	12	36.0	3.93	6.0
Newark Valley	......	......	......	4.54	18.5
New Lisbon	64	3	34.6	4.13	14.5
North Hammond	66	12	36.5	3.80	1.0
North Lake	61	6	34.6	5.96	10.0
Number Four	60	6	34.0	6.35	7.0
Nunda	68	12	40.4	1.35	0.2
Ogdensburg	60	8	36.3	2.99	1.0
Old Chatham	......	......	......	3.99	9.0
Oneonta	67	12	38.5	3.45	13.4
Oxford	67	8	37.6	4.32	12.0
Palermo	......	......	......	1.89	......
Penn Yan	65	14	38.8	1.95	0.5
Perry City	67	9	36.5	2.28	6.0
Plattsburg Barracks	59	10	36.9	......	......
Port Jervis	70	10	41.4	3.23	9.0
Primrose	69	18	42.4	4.85	8.0
Redhook	......	......	......	6.36	11.0
Richmondville	67	11	37.8	3.54	15.0
Ridgeway	65	15	38.2	1.84	3.1
Rome	66	14	38.6	4.40	4.0
Romulus	67	15	39.2	2.17	3.0
Salisbury Mills	......	......	......	3.59	......
Saranac Lake	66	3	34.8	2.45	9.0
Saratoga Springs	63	20	40.0	4.23	14.0

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
New York—Cont'd.	°	°	°	Ins.	Ins.
Setauket	63	23	42.0	5.85	7.7
Shortsville	65	15	38.7	1.98	T.
Skaneateles	......	......	......	4.13	......
Southampton	63	21	41.0	6.09	2.6
South Canisteo	68	7	38.0	2.73	5.5
Southeast Reservoir	......	......	......	7.01	......
South Kortright	64	1	36.6	3.28	13.0
South Schroon	57	13	35.8	5.64	12.3
Straits Corners	65	8	37.0	4.37	9.5
Ticonderoga	65	11	38.6	3.12	12.0
Walton	65	5	38.0	3.75	12.2
Wappingers Falls	66	11	41.3	5.04	12.0
Warwick	......	......	......	3.92	......
Watertown	64	11	37.4	3.93	2.0
Waverly	70	13	39.1	4.56	9.9
Wedgwood	64	11	36.8	2.87	6.0
Wells	63	11	36.9	6.78	8.8
West Berne	69	16	40.0	2.50	15.0
West Chazy	58	11	36.1	......	......
Westfield *b*	66	11	38.4	1.48	......
Westfield *c*	69	13	38.3	1.00	1.0
Windham	65	3	36.8	4.00	13.7
Wolcott	......	......	......	3.72	2.5
North Carolina.					
Abshers	73	16	46.5	4.74	T.
Biltmore	64	10	44.8	3.93	1.0
Brevard	74	14	45.8	4.39	
Bryson City	......	......	......	6.81	T.
Chapelhill	78	19	50.6	2.95	
Cherryville	73	18	49.5	4.68	
Cranberry	65	10	42.5	5.76	7.3
Currituck	......	......	......	2.57	
Durham	......	......	......	2.94	
Edenton	78	28	53.6	3.53	
Fayetteville	82	21	53.6	2.44	T.
Goldsboro	79	22	52.4	3.91	......
Greensboro	75	19	48.7	3.94	
Henderson	76	19	50.1	2.89	2.0
Hendersonville	70	12	46.5	5.99	T.
Henrietta	76	21	51.5	5.45	
Highlands	64	4	41.2	10.90	1.0
Horse Cove	68	12	44.9	9.25	0.3
Hot Springs	76	18	51.0	......	1.0
Kinston	83	22	54.9	3.04	T.
Lenoir	77	20	47.8	4.23	T.
Linville	59	6	39.0	3.92	3.0
Littleton	77	17	50.0	3.00	3.0
Louisburg	78	20	51.5	2.35	T.
Lumberton	78	25	53.1	2.52	T.
Marion	77	18	48.9	5.70	T.
Marshall	73[e]	12[e]	46.3[e]	4.17	2.0
Mocksville	71	19	45.8	4.26	
Moncure	80	18	52.1	2.45	T.
Monroe	79	16	50.0	3.19	
Mountairy	73	20	47.6	4.16	
Murphy	......	......	......	6.25	0.5
Newbern	81	22	54.6	3.20	
Oakridge	75	17	48.5	4.59	T.
Patterson *[1]	70	19	44.1	4.85	T.
Penelo	79	22	53.0	2.41	
Pittsboro	76	18	48.4	3.30	
Red Springs[a]	80	22	54.3	2.35	
Reidsville	76	18	49.4	4.58	
Rockingham	80	21	51.7	2.96	T.
Roxboro	76	18	50.3	3.80	T.
Salem	76	20	49.0	4.59	
Salisbury	78	19	50.6	4.23	
Saxon	80	15	48.2	3.87	T.
Selma	80	20	52.4	3.03	0.3
Settle	72	20	49.0	4.52	T.
Sloan	87	22	53.6	3.08	T.
Soapstone Mount	77[e]	16[e]	49.2[e]	3.42	
Southern Pines *a*	82	19	55.4	2.81	T.
Southern Pines *b*	79	20	53.6	2.58	T.
Southport	76	24	55.0	5.25	T.
Springhope *[1]	75	21	51.2	1.83	1.0
Statesville	76	15	48.6	4.24	
Tarboro	82	22	53.9	2.86	T.
Washington	83	22	54.6	3.39	T.
Waynesville	68	13	45.8	4.57	T.
Weldon *a*	76	22	49.9	3.49	T.
Weldon *b*	......	......	......	3.43	
North Dakota.					
Amenia	57	−9	31.2	1.32	6.2
Ashley	54[1]	−16	26.2[f]	2.93	5.0
Berlin	58	−16	28.0	2.86	14.7
Buxton	54	−14	29.7	3.06	21.4
Cando	52[e]	−15[e]	27.0[d]	3.69	12.0
Churchs Ferry	53	−22	26.8	3.49	8.7
Coalharbor	52	−19	25.8	3.73	22.5
Devils Lake	52	−14	26.5	2.86	13.0
Dickinson	51	−20	27.2	2.64	9.0
Donnybrook	......	......	......	4.65	20.5
Ellendale	57	−11	29.6	4.25	14.0
Falconer	53	−19	27.0	3.50	15.0
Fargo	57	−13	30.6	1.42	8.6
Forman	57	−11	29.6	2.62	10.6
Fort Yates	56	−16	28.4	2.64	19.7

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
North Dakota—Cont'd.	°	°	°	Ins.	Ins.
Fullerton	57	−13	28.6	3.75	12.7
Gallatin	55	−16	26.6	2.40	6.9
Glenullin	55	−17	27.8	2.97	8.5
Grafton	55	−14	27.9	2.47	4.7
Hamilton	55	−16	25.1	1.90	6.5
Hannaford	57	−17	28.2	1.96	2.5
Jamestown	58	−16	28.2	2.58	6.5
Larimore	61	−15	27.1	2.64	8.0
McKinney	45	−25	21.8	0.51	3.1
Mayville	60	−12	28.5	1.90	6.0
Medora	56	−21	30.8	2.16	10.0
Melville	55	−5	30.4	1.76	1.3
Milton	59	−21	24.6	3.23	7.9
Minot	52	−18	26.2	......	......
Minto	57	−14	27.0	2.29	8.7
Napoleon	55	−20	25.2	2.70	14.0
New England	53	−20	27.3	1.33	2.5
Oakdale	56	−19	27.6	4.83	40.3
Power	60	−10	30.4	1.78	3.0
Steele	54[e]	−19[e]	26.7[e]	2.50	17.0
University	59	−13	31.0	1.74	4.5
Wahpeton	65	0	35.3	1.64	11.4
Willow City	45	−20	22.4	......	......
Woodbridge	47	−25	23.8	3.64	21.4
Ohio.					
Akron	70	9	40.4	2.54	6.1
Annapolis	69	5	39.8	3.43	......
Atwater	......	......	......	2.30	3.0
Bangorville	75	6	42.2	3.29	5.0
Bellefontaine	66	9	41.3	2.74	1.0
Bement	......	......	......	2.20	2.5
Benton Ridge	69	10	41.6	2.74	3.9
Bethany	71	8	44.0	2.12	T.
Binola	......	......	......	2.46	6.0
Bladensburg	72	9	41.7	3.84	2.6
Bloomingburg	68	9	42.1	2.78	......
Bowling Green	71	10	41.3	3.77	2.0
Cambridge	73	−4	43.5	2.69	6.0
Camp Dennison	74	12	44.9	1.76	2.0
Canaan	......	......	......	2.26	3.0
Canal Dover	71	5	41.2	2.84	4.0
Canton	70	10	41.0	2.11	0.8
Cardington	69	9	41.1	1.89	3.4
Cedarville	......	......	......	2.17	1.5
Circleville	73	10	43.1	2.03	6.0
Clarksville	71	10	44.2	2.10	1.4
Cleveland *a*	71	15	40.9	2.63	3.7
Cleveland *b*	70	15	40.8	2.07	0.9
Clifton	70	9	43.1	2.42	0.5
Coalton	75	5	43.5	2.75	12.7
Colebrook	......	12[e]	......	1.58	3.0
Dayton *a*	......	......	......	2.62	0.3
Dayton *b*	70	9	43.0	2.55	0.7
Defiance	71	10	41.4	3.76	0.1
Delaware	69	10	41.6	2.81	2.5
Demos	69	8	41.6	3.86	9.0
Dunham	......	......	......	3.75	10.5
Elyria	72	10	39.7	2.68	0.6
Findlay	72	9	42.2	3.50	2.0
Frankfort	73	7	42.6	2.18	6.0
Fremont	73	11	42.0	3.46	1.0
Garrettsville	71	6	40.0	2.11	3.4
Granville	70	10	42.6	3.22	2.7
Gratiot	70	3	42.4	2.69	7.2
Green	75	6	43.6	3.15	9.0
Greenfield	70	11	43.1	2.63	5.3
Greenhill	71	5	39.8	2.49	4.0
Greenville	70	8	43.4	3.08	1.0
Hanging Rock	75	6	44.8	3.72	12.5
Hedges	70	8	41.2	4.25	0.8
Hillhouse	70	8	37.8	1.98	2.5
Hillsboro	70	10	42.8	2.05	......
Hiram	66	5	39.6	1.64	4.0
Hudson	71	3	39.8	1.81	5.0
Jacksonboro	68	8	42.9	2.15	2.0
Lancaster	73	7	43.2	2.94	4.0
Lima	70	10	39.9	3.53	5.0
McConnellsville	74	3	42.2	3.05	10.5
Manara	69	10	42.2	2.80	......
Mansfield	......	......	......	2.58	1.3
Marietta	75	9	45.4	3.60	13.2
Marion	71	9	42.0	2.50	T.
Medina	70	6	40.4	2.21	3.0
Milfordton	69	8	39.9	3.60	2.2
Milligan	73	7	42.0	2.76	9.0
Millport	70	1	39.0	3.13	5.7
Montpelier	67	10	39.8	3.38	2.0
Moorefield	72	−2	41.8	2.70	7.0
Napoleon	74	11	43.9	2.36	T.
New Alexandria	73	4	42.6	3.80	14.0
New Berlin	70	8	40.8	2.16	1.0
New Bremen	70	9	42.2	3.05	T.
New Lexington	......	......	......	2.87	4.0
New Paris	73	8	42.6	3.40	2.0
New Richmond	72	10	45.1	1.60	1.9
New Waterford	69	4	40.4	3.22	6.5
North Lewisburg	71	7	41.6	3.30	1.0
North Royalton	71	2	39.8	2.59	6.0

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Ohio—Cont'd.	°	°	°	*Ins.*	*Ins.*
Norwalk	72	10	40.0	3.35	1.5
Oberlin	71	10	40.6	2.68	0.6
Ohio State University	68	10	41.7	2.48	0.2
Orangeville	70	10	40.8	2.02	T.
Ottawa	70	9	41.4	3.58	T.
Pataskala	69	9	41.9	3.24	3.5
Philo	73	10	42.9	2.18	11.0
Plattsburg	69	8	42.1	2.12	1.0
Pomeroy	82	6	45.0	3.40	12.7
Portsmouth *a*	.....	.....	.....	3.58	14.0
Portsmouth *b*	76	12	47.5	3.45	14.0
Pulse	.....	.....	.....	1.90	8.0
Red Lion	.....	.....	.....	2.54	.....
Richfield	.....	.....	.....	2.75	2.0
Richwood	75	9	42.4	.....	.....
Ripley	65	10	42.6	3.03	11.2
Rittman	71	11	42.1	3.20	2.0
Rock	.....	.....	.....	3.63	6.0
Rockyridge	73	8	41.5	2.70	1.5
Shenandoah	71	9	40.2	2.25	5.0
Sidney	69	9	42.7	2.61	1.7
Somerset	73	10	44.3	1.68	4.2
Springfield	.....	.....	.....	2.92	.....
Strongsville	.....	.....	.....	2.74	2.0
Swanton	.....	.....	.....	2.69	T.
Thurman	75	6	45.6	4.10	17.0
Tiffin	69	11	41.2	3.39	2.0
Upper Sandusky	70	10	42.1	3.33	T.
Urbana	67	9	40.4	2.52	0.8
Vickery	70	10	40.0	2.75	1.0
Walnut	.....	.....	.....	2.43	4.4
Warren	71	10	40.9	1.72	3.0
Warsaw	71	3	41.0	3.20	.....
Wauseon	70	9	39.8	4.96	2.7
Waverly	75	4	43.8	3.25	15.0
Waynesville	70	10	42.8	2.25	T.
Wellington	71	11	40.8	2.57	2.0
Westerville [1]	68	10	39.0	.....	.....
Willoughby	.....	.....	.....	1.66	.....
Wooster	69	9	41.3	2.99	1.0
Zanesville	.....	.....	.....	2.57	8.2
Oklahoma.					
Ames	80	19	50.6	2.51	
Arapaho	80	13	52.0	3.50	
Beaver	76	11	47.4	1.05	4.0
Blackburn	78	20	50.6	4.49	
Burnett	81	22	52.7	3.57	
Chandler	81	23	52.8	3.91	
Clifton	81	21	51.9	4.12	
Cloud Chief	80	18	51.6	4.83	
Fort Reno	80	20	51.8	4.52	
Fort Sill	81	25	53.6	3.05	
Guthrie	79	20	50.2	6.16	
Hennessey	80	15	52.6	3.44	T.
Jefferson	82	15	49.6	2.52	T.
Jenkins	81	16	50.9	4.23	1.5
Kenton	73	11	43.2	1.20	T.
Kingfisher	79	20	51.2	5.93	T.
Mangum	80	30	53.6	2.40	
Newkirk	77	19	49.0	3.22	
Norman	83	20	51.8	4.06	
Pawhuska	79	20	50.0	4.65	
Perry	80	16	50.6	4.23	
Shawnee	80	23	52.8	4.78	
Stillwater	79	20	51.5	5.03	
Taloga	78	19	48.8	2.79	T.
Waukomis	79	20	50.9	3.21	
Weatherford	80	20	53.0	2.70	T.
Oregon.					
Albany *a* *1	62	32	44.5	3.11	
Albany *b*	.....	.....	.....	6.04	T.
Alpha	66	30	44.5	14.85	1.3
Arlington	.....	23	.....	0.25	
Ashland *b*	67	28	43.2	2.03	7.5
Aurora *1	65	32	45.5	4.18	
Aurora (near)	66	28	44.5	5.32	T.
Bay City	62	26	43.6	19.01	
Bend	54[e]	3[e]	34.8[e]	0.65	7.5
Beulah	62	12	36.1	0.77	7.0
Blackbutte	67	25	43.5	5.60	11.0
Blalock	65	29	47.4	0.70	
Brownsville *1	60	38	48.2	5.86	
Bullrun	.....	.....	.....	11.51	1.0
Burns	55	14	35.1	0.90	7.2
Cascade Locks	61	31	43.9	11.26	
Comstock *1	70	34	46.5	4.91	0.8
Coquille	.....	.....	.....	11.89	
Corvallis	64	31	44.8	6.96	
Dayville	64	18	41.7	1.19	1.0
Detroit	65	27	40.6	8.71	12.0
Doraville	62	29	41.2	6.90	7.5
Ella	.....	.....	.....	0.43	T.
Eugene	63	32	44.6	4.19	
Fairview	.....	30	.....	13.03	1.0
Falls City	62	27	42.5	14.50	2.3
Forestgrove	64	28	44.3	6.76	
Gardiner	59	31	45.4	16.83	
Glenora	68	28	41.0	15.38	15.0

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Oregon—Cont'd.	°	°	°	*Ins.*	*Ins.*
Government Camp	48	15	31.2	10.27	74.0
Grants Pass	71	22	45.1	2.35	
Hare	60	32	42.9	17.71	4.5
Heppner	63	24	42.7	1.46	2.0
Hood River (near)	61	27	43.1	3.61	0.8
Huntington	67	18	44.2	0.86	
Jacksonville	68	28	44.4	2.14	T.
Joseph	58	13	32.0	1.88	18.8
Junction City *1	68	34	46.2	3.17	
Kerby	69	25	43.2	5.57	5.0
Klamath Falls	69	10	38.6	0.50	5.0
Lafayette *1	65	34	45.5	4.63	
Lagrande	58	18	38.8	1.83	3.2
Lakeview	58	14	33.4	1.41	15.5
McMinnville	64	29	44.8	7.00	T.
Merlin *1	70	26	47.6	0.74	
Monroe	62	30	44.1	7.96	T.
Mount Angel	66	31	45.0	5.89	T.
Nehalem	.....	.....	.....	16.15	
Newberg	66	27	44.6	6.62	T.
Newport	57	32	44.7	12.78	
Pendleton	68	31[f]	48.7[c]	0.59	
Pine	64	10	38.6	0.69	1.0
Placer	.....	.....	.....	3.54	3.5
Riddles *1	72	33	44.9	3.68	
Salem *b*	61	30	45.0	6.00	
Sheridan *1	56	33	45.6	6.50	
Silverlake	60	6	34.0	0.25	2.5
Silverton *1	56	38	46.9	5.12	T.
Siskiyou *1	62	27	37.2	4.20	42.0
Smock	55	25	39.9	0.54	2.5
Sparta	51	13	33.0	1.30	13.0
Springfield *1	63	36	45.6	3.84	
Stafford	64	29	44.2	6.39	1.5
The Dalles	65	26	45.4	0.52	
Toledo	65	29	45.1	14.69	
Umatilla	.....	.....	.....	0.05	
Vale	60	13	39.8	0.80	
Westfork *1	66	28	44.6	2.70	2.0
Weston	63	24	40.7	1.19	0.8
Williams	69	26	45.5	2.76	T.
Pennsylvania.					
Aleppo	72	5	43.2	4.46	17.0
Altoona	66[d]	9	39.4	3.96	.....
Athens	68	15	39.2	3.41	8.7
Beaver Dam	.....	.....	.....	2.99	.....
Brookville	.....	.....	.....	3.64	6.8
Browers Lock	.....	.....	.....	3.80	.....
California	72	2	43.4	3.58	17.2
Cassandra	63	9	38.8	3.75	25.5
Clarion	.....	.....	.....	3.70	3.9
Coatesville	76	17	44.3	5.00	11.0
Confluence	.....	.....	.....	4.44	14.3
Davis Island Dam	.....	.....	.....	3.49	.....
Derry Station	74	8	41.9	4.00	15.0
Doylestown	.....	.....	.....	6.16	.....
Drifton	66	10	40.9	4.60	12.0
Driftwood	.....	.....	.....	3.82	1.0
Duncannon	.....	.....	.....	5.70	21.0
Dushore	65	12	37.4	5.66	21.2
Dyberry	65	14	37.8	2.98	12.0
East Bloomsburg	.....	.....	.....	1.65	0.2
East Mauch Chunk	72	13	41.9	4.89	11.5
Easton	71	16	43.2	3.37	10.1
Ellwood Junction	.....	.....	.....	3.48	3.0
Emporium	64	8	40.1	3.78	3.2
Ephrata	71	17	43.4	3.68	13.0
Everett	71[f]	13[f]	38.6[f]	4.84	22.0
Forks of Neshaminy *1	70	16	42.2	3.45	7.0
Franklin	73	10	41.1	1.99	1.0
Freeport	.....	.....	.....	4.63	12.0
Girardville	.....	.....	.....	6.39	17.0
Grampian	65	10	37.9	2.87	15.0
Greensboro	.....	.....	.....	3.72	14.0
Hamburg	.....	.....	.....	4.38	13.0
Hamlinton	65	12	36.6	3.38	16.0
Hawthorn	73	4	41.4	3.41	4.0
Herrs Island Dam	.....	.....	.....	3.60	15.0
Huntingdon *a*	73	11	41.4	5.24	19.5
Huntingdon *b*	.....	.....	.....	4.32	8.7
Irwin	.....	.....	.....	3.54	14.0
Johnstown	71	13	42.9	5.09	16.5
Kennett Square	75	16	44.6	4.28	7.0
Lancaster	74[h]	17[h]	43.2[h]	5.78	9.0
Lansdale	.....	.....	.....	3.74	.....
Lawrenceville	69	7	37.4	2.30	6.0
Lebanon	73	17	43.4	4.79	13.0
Leroy	65	10	37.3	4.76	15.2
Lewisburg	70	17	42.0	5.84	18.0
Lockhaven *a*	73	12	43.2	4.93	19.0
Lockhaven *b*	.....	.....	.....	4.32	16.0
Lock No. 4	.....	.....	.....	3.04	7.0
Lycippus	78	9	41.1	3.91	22.0
Mifflin	.....	.....	.....	5.10	18.0
Oil City	.....	.....	.....	3.12	0.7
Ottsville	.....	.....	.....	3.62	.....
Parker	.....	.....	.....	3.22	3.5
Philadelphia	74	22	46.6	4.50	8.0

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Pennsylvania—Cont'd.	°	°	°	*Ins.*	*Ins.*
Pocono Lake	64	4	35.6	5.63	11.0
Point Pleasant	.....	.....	.....	3.28	.....
Pottstown	70	21	46.4	3.52	12.5
Pottsville	.....	.....	.....	5.49	.....
Quakertown	73	14	43.2	4.90	13.0
Reading [2]	.....	.....	42.8	3.00	.....
Renovo *a*	.....	.....	.....	3.25	.....
Saegerstown	70	8	39.8	2.41	T.
St Marys	65	8	37.8	2.39	6.5
Saltsburg	.....	.....	.....	4.16	13.0
Seisholtzville	.....	.....	.....	4.56	.....
Selinsgrove	72	13	43.2	5.08	17.0
Shawmont	.....	.....	.....	3.59	.....
Smiths Corners	.....	.....	.....	3.50	.....
Somerset	76	4	41.8	7.50	24.8
South Eaton	68	11	40.8	4.06	13.0
State College	64	11	39.6	4.91	18.4
Sunbury	.....	.....	.....	4.10	16.0
Swarthmore	76	20	43.5	4.02	6.0
Towanda	68	8	39.8	4.07	14.4
Troutrun	.....	.....	.....	6.98	12.0
Uniontown	74	13	44.2	5.66	22.0
Warren	60	8	35.2	1.36	0.5
Wellsboro	68	12	39.9	2.67	12.0
Westchester	75	17	43.8	4.65	9.0
West Newton	.....	.....	.....	4.12	16.0
Westtown	74	17	43.8	2.81	8.0
Wilkesbarre	74	16	41.2	3.19	18.0
Williamsport	65	7	40.3	4.05	14.8
York	74	17	43.6	4.80	17.5
Rhode Island.					
Bristol	60	26	41.3	5.32	7.5
Kingston	64	19	40.0	7.29	7.5
Pawtucket	65	22	42.5	5.93	7.5
Providence *a*	67	26	43.8	5.71	8.0
Providence *c*	66	22	42.0	6.05	10.0
South Carolina.					
Aiken	79	25	55.9	5.32	
Allendale	76	29	56.7	4.28	
Anderson	76	25	52.3	4.93	
Barksdale	75	17	51.0	4.38	
Batesburg	79	24	53.4	6.62	
Beaufort	80	31	58.1	4.34	
Blackville	84	27	56.2	4.98	
Bowman	82	27	56.8	3.38	
Calhoun Falls	.....	.....	.....	6.20	
Camden	.....	.....	.....	3.69	
Cheraw *a*	80	21	52.4	2.84	
Cheraw *b*	.....	.....	.....	2.62	
Clemson College	76	22	49.6	4.70	
Conway	82	25	55.0	3.25	
Darlington	81	22	54.0	1.90	
Duewest	75	25	53.3	5.52	
Edisto	.....	.....	.....	3.38	
Effingham	.....	.....	.....	3.58	
Florence	78	24	53.7	1.98	
Gaffney	78	22	51.3	5.24	
Georgetown	83	26	58.9	6.00	
Gillisonville	86	21	56.8	4.71	
Greenville	75	19	47.6	4.52	
Greenwood	76	23	51.8	5.59	
Heath Springs	74	19	51.5	3.12	
Kingstree *b*	.....	.....	.....	2.60	
Liberty	76	23	51.5	4.38	
Little Mountain	81	23	54.0	4.43	
Longshore	79	22	53.4	4.67	
Lugoff	81	23	54.6	3.79	
Pinopolis *1	78	30	57.1	3.50	
St. Stephens	.....	.....	.....	3.27	
Santuck	78	20	52.2	3.65	
Seivern	80[c]	22	54.7	6.01	
Smiths Mills	.....	.....	.....	4.83	
Society Hill	80	24	54.0	2.43	
Spartanburg	77	21	50.6	5.02	
Statesburg	83	24	56.6	3.21	
Summerville	84	28	56.8	3.29	
Sumter	79	25	56.4	2.90	
Temperance	80	25	53.4	3.13	
Trenton	78	25	54.1	7.19	
Trial	77	18	51.9	3.20	
Walhalla	77	19	48.9	4.75	T.
Winnsboro	78	22	53.6	2.83	
Winthrop College	76	20	53.1	4.12	
Yorkville	79	23	54.4	4.12	
South Dakota.					
Aberdeen	60	−10	30.4	2.82	12.0
Academy	70	−7	35.4	1.90	6.0
Alexandria	73	−8	36.4	1.01	4.5
Armour	74	−5	36.7	2.00	2.0
Ashcroft	64	−20	32.2	2.05	17.5
Bad Nation [d]	71	−7	36.4	1.09	1.0
Bowdle	58	−15	29.3	1.52	5.0
Brookings	66	−8	33.4	0.67	3.4
Canton	68	0	38.0	0.43	2.0
Centerville	.....	.....	.....	1.82	11.5
Chamberlain	70	−7	35.3	1.64	2.8
Clark	69	.....	.....	2.07	6.6
Desmet	64	−9	33.6	2.17	16.0

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
South Dakota—Cont'd.					
Doland	66	−9	33.4	1.83	7.9
Elkpoint	75	−4	40.2	1.62	3.0
Farmingdale	.....	.....	.....	2.47	.....
Faulkton	61	−10	30.4	2.68	8.2
Flandreau	65	−9	35.0	0.65	1.8
Forestburg	70	−10	34.4	1.57	9.0
Fort Meade	62	−8	33.4	5.53	34.3
Fort Randall	77[e]	6[e]	40.8[e]	2.37	0.5
Gannvalley	73	−8	35.7	2.54	4.0
Grand River School	60	−15	30.6	1.36	15.0
Greenwood	75	−3	38.5	1.90	3.7
Hartman	68	−10	33.4	1.08	2.7
Hotch City	67	−8	34.4	1.60	6.7
Howard	68	−5	34.4	1.36	6.1
Howell	63	−10	31.7	2.45	4.7
Ipswich	59	−11	30.0	3.25	6.5
Kimball	67	−8	34.3	1.85	5.3
Leola	58	−15	28.0	3.54	8.5
Leslie	67	−10	33.4	2.60	.....
Marion	70	−6	34.6	0.86	.....
Mellette	62	−9	33.0	1.82	3.0
Menno	70	−6	37.2	1.03	3.8
Millbank	70	−8	34.4	1.37	.....
Mitchell	71	−6	35.4	1.37	2.5
Oelrichs	67	−5	34.4	2.30	5.0
Pedro	70	−10	36.9	2.08	T.
Pine Ridge	65	−11	35.4	1.48	.....
Plankinton	68	−8	34.0	1.96	2.5
Redfield	64	−9	32.1	1.34	6.5
Rochford	55	−9	26.8	2.58	19.3
Rosebud	67	−9	35.2	0.48	0.9
St. Lawrence	69	−10	32.8	1.41	.....
Silver City	.....	.....	.....	2.12	18.0
Sioux Falls	67	−8	35.1	1.35	5.5
Sisseton Agency	62	−11	31.5	1.01	4.3
Tyndall	73	−4	37.2	1.04	4.9
Vermilion	70	−4	38.2	0.99	3.0
Waubay	60	−13	30.4	1.34	4.5
Wentworth	70	−8	35.4	0.88	3.3
Wessington Springs	65	−10	32.4	2.65	9.5
Wolsey	.....	.....	.....	2.38	7.5
Tennessee.					
Andersonville	77	13	48.2	7.78	2.0
Ashwood	77	17	50.9	7.40	
Benton	77	17	51.2	5.86	2.0
Bolivar	74	22	50.2	8.43	.....
Bristol	72	10	46.0	3.88	2.0
Byrdstown	75	13	49.1	7.92	4.5
Carthage	76	16	49.8	7.58	1.5
Charleston	.....	.....	.....	6.56	1.0
Clarksville	73	15	50.2	5.66	3.5
Clinton	.....	.....	.....	7.47	2.0
Decatur	85	16	50.0	7.07	1.7
Dickson	75	13	49.4	6.00	1.0
Dover	78	17	50.4		
Elizabethton	74	10	46.8	3.55	3.0
Erasmus	76	14	46.4	3.83	1.8
Florence	73	16	50.1	9.53	3.0
Franklin	74	18	50.4	9.89	2.0
Grace *[1]	80	18	53.0	10.90	2.0
Greeneville	73	12	47.9	4.52	1.2
Harriman	76	15	48.2	9.68	1.0
Iron City	77	18	50.8	11.24	
Isabella	72	14	46.2	5.55	1.0
Johnsonville	75	17	50.8	5.91	0.5
Jonesboro *[1]	70	21	48.8	4.60	3.0
Kenton *[5]	71	19	49.6	.....	.....
Kingston	.....	.....	.....	7.57	0.5
Lafayette *[5]	74	14	45.9	7.18	5.0
Lewisburg	78	17	50.4	12.50	3.0
Liberty	80	15	51.2	5.99	2.0
Lynnville	72	16	49.5	11.88	2.0
McKenzie	74	16	51.6	5.70	
Maryville	77	17	49.6	6.05	3.0
Newport	76	16	49.4	5.15	2.0
Nunnelly	75	15	48.8	8.19	
Oakhill	76	13	48.4	9.71	
Palmetto	77	17	51.4	10.75	2.0
Pope	77	17	52.4	7.85	
Rogersville	73	15	47.4	5.13	1.4
Rugby	76	9	47.2	11.75	6.5
Savannah	75	22	52.6	9.14	T.
Sewanee	75	10	48.1	5.61	2.0
Silverlake	65	9	42.9	4.47	6.2
Tazewell	.....	.....	.....	7.46	3.7
Tellico Plains	79	17	50.6	5.36	1.8
Tracy City	74	12	48.2	6.06	T.
Trenton	74	20	51.4	5.84	T.
Tullahoma	78	13	50.0	8.35	2.0
Union City	76	.....	.....	5.95	1.0
Waynesboro	75	16	49.6	8.50	
Wildersville	74	21[e]	53.0	9.42	
Yukon	79	12	52.0	6.43	
Texas.					
Albany	87	28	56.4	2.38	
Alvin	.....	.....	.....	0.73	
Anna	84	28	57.2	7.10	
Anson	.....	.....	.....	1.50	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
Texas—Cont'd.					
Arthur	.....	.....	.....	4.13	
Austin *a*	85	28	61.0	0.90	
Austin *b* *[5]	84	25	59.7	.....	
Ballinger	90	29	56.6	0.75	
Bastrop	90	28	64.0	0.67	
Beaumont	82	30	62.2	2.86	
Beeville	92	47[j]	67.6[e]	0.09	
Bigspring	.....	.....	.....	T.	
Blanco	88	20	57.8	1.70	
Boerne *[1]	90	32	60.6	1.97	
Booth	.....	.....	.....	1.21	
Bowie	87	25	55.9	4.29	
Brazoria	82	32	63.8	1.49	
Brenham	87	37	63.4	1.78	
Brighton	85	38	65.2	0.27	
Burnet	98	26	62.2	4.12	
Camp Eagle Pass	92	41	68.4	T.	
Coleman	90	30	58.4	1.79	
College Station	.....	34	.....	1.10	
Colorado	88	21	54.7	0.41	
Columbia	83	31	64.2	1.17	
Comanche	85[i]	29[i]	57.8[i]	1.05	
Corsicana	90	32	61.0	2.30	
Cotulla	.....	39	.....	T.	
Cuero	88	32	64.4	0.25	
Dallas	94	29	58.8	3.37	
Danevang	85	33	64.2	0.70	
Dublin	89	27	56.0	0.95	
Duval	87	32	60.2	1.26	
Estelle	95	26	58.0	4.10	
Fort Brown	95	40	69.2	0.00	
Fort Clark	95	32	66.1	1.11	
Fort Davis	76	25	52.3	0.02	T.
Fort Ringgold	108	34	76.0	T.	
Fredericksburg	80	22	59.4	3.02	
Gainesville	87[e]	22[e]	55.3[d]	4.14	
Georgetown *[1]	86	31	59.4	1.48	
Grapevine	95	25	57.8	8.81	
Greenville	86	.....	.....	3.23	
Hale Center	78	18	52.0	0.50	
Hallettsville	86	29	65.0	0.87	
Haskell	93	25	56.0	1.01	
Henrietta	85	24	55.0	3.91	
Hewitt	.....	.....	.....	1.97	
Hondo	.....	.....	.....	1.45	
Houston	87	35	63.4	1.13	
Huntsville	83	33	60.5	3.14	
Ira	89[e]	22	54.8	T.	
Jacksonville	83	31	59.6	3.81	T.
Jasper	85	30	62.8	3.21	
Junction	.....	.....	.....	0.52	
Kaufman	88	29	59.1	2.53	
Kent	.....	.....	.....	T.	
Kerrville	86	25	59.0	2.41	
Kopperl	.....	.....	.....	2.50	
Lampasas	94	25	60.3	1.77	
Laureles Ranch	.....	.....	.....	0.00	
Llano *[5]	83	36	61.0	1.13	
Longview	82	27	55.0	3.59	
Luling	89	26	64.0	0.37	
Mann	89	30	58.8	2.70	
Menardville	91	26	57.2	0.00	
Mount Blanco	80	17	50.6	0.02	
Nacogdoches	84	33	59.0	5.21	
New Braunfels	89	27	63.1	0.63	
Panter	.....	.....	.....	1.29	
Pearsall	91	37	67.4	0.22	
Port Lavaca	84	38	65.4	0.25	
Rhineland	90	27	57.6	0.57	
Rockisland	86	33	63.5	0.82	
Rockport	73	49	61.0	1.00	
Runge	92[d]	34[d]	66.2[d]	0.20	
Sanderson	77	30	54.6	T.	
San Marcos	87	25	62.6	0.40	
San Saba	89	28	59.8	1.36	
Santa Gertrude Ranch	.....	.....	.....	0.11	
Shaeffer Ranch	94	23	68.6	T.	
Sherman	87	30	56.3	5.44	
Sugarland	84	33	63.7	2.15	
Sulphur Springs	84	29	57.2	3.41	
Temple *a*	88	32	59.8	2.37	
Temple *b*	87	28	58.5	2.25	
Trinity	84	28	61.4	3.32	
Tulia	80	13	46.8	0.65	
Tyler	90	34	61.0	2.66	
Victoria	.....	.....	.....	0.68	
Waco	92	31	61.8	2.35	
Waxahachie	93	32	58.0	2.55	
Weatherford	91	24	55.9	4.63	
Weimar	96	38	66.4	2.38	
Wichita Falls	.....	.....	.....	2.66	
Utah.					
Alpine	.....	.....	.....	1.76	17.6
Aneth	67	14	41.6	0.46	.....
Blackrock	60	12	35.7	1.15	18.0
Bluecreek *[1]	60	20	40.1	0.10	1.0
Castledale	66	−2[k]	32.8[f]	0.62	.....
Cisco	60	22	38.6	0.10	1.0

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
Utah—Cont'd.					
Corinne	66	12	36.8	1.11	T.
Coyoto	60	−1	31.0	0.95	9.5
Deseret	66	10	37.0	0.82	13.0
Emery	54	12	33.0	0.10	1.0
Farmington	56	18	36.8	1.73	15.0
Fillmore	69	10	38.6	2.59	.....
Fort Duchesne	50	9	35.0	0.14	1.4
Frisco	59	11	34.0	0.72	.....
Giles	63	10	39.1	0.41	3.0
Government Creek	57	10	34.2	1.50	15.0
Green River	66	22	44.2	0.08	0.8
Grover	59	10	33.6	1.55	15.5
Heber	58	10	32.6	1.46	6.0
Henefer	57	1	32.8	1.86	15.0
Hite	69	24	47.0	.....	.....
Huntsville	.....	.....	.....	1.82	12.0
Kelton *[1]	60	17	37.2	0.10	1.0
Lasal	54	8	31.4	1.87	18.7
Levan	54	12	33.3	2.41	21.9
Loa	56	−5	24.6	1.50	15.0
Logan	55	8	34.0	2.53	.....
Lund	62	13	34.9	0.53	.....
Manti	54	11	33.0	1.50	6.0
Marysvale	60	3	33.2	1.02	10.2
Meadowville	47	0	27.6	1.00	15.0
Millville	.....	.....	.....	0.37	.....
Minersville	62	4	35.8	1.22	12.0
Moab	68	18	42.8	0.91	1.0
Mount Nebo	58	7	36.4	0.40	3.0
Mount Pleasant	55	11	33.0	1.06	10.0
Ogden	58	12	36.8	1.15	4.5
Park City	43	2	24.3	4.04	40.0
Parowan	63	3	34.6	1.83	20.3
Pinto	59	−6	30.0	2.66	25.0
Promontory *[1]	56	20	39.0	0.50	5.0
Provo	64	14	38.2	1.30	.....
Ranch	50	1	24.6	6.06	.....
Richfield	58	14	36.0	1.35	6.5
St. George	73	18	44.4	1.35	T.
Scipio	59	11	35.8	2.25	14.0
Snowville	59	−1	33.4	1.32	.....
Soldier Summit	48	−9	22.4	0.80	8.0
Terrace	.....	.....	.....	T.	T.
Thistle	63	15	38.8	2.00	20.0
Tooele	58	16	36.6	1.19	.....
Vernal	58	10	35.6	0.86	3.5
Virgin	.....	.....	.....	1.30	.....
Wellington	56	3	33.1	1.05	10.5
Vermont.					
Burlington	60	14	38.0	2.82	5.5
Chelsea	59	10	33.2	5.15	20.0
Cornwall	60	14	37.0	3.53	7.0
Enosburg Falls	67	−1	34.2	4.81	9.0
Hartland	57	3	36.8	5.27	.....
Jacksonville	60	10	36.8	5.20	27.7
Manchester	61	15	37.1	1.74	8.0
Norwich	58	5	35.8	5.20	16.0
St. Johnsbury	64	2	36.3	4.16	10.5
Wells	58	12	35.1	3.60	10.0
Woodstock	52	2	33.3	3.97	21.0
Virginia.					
Alexandria	78	19	46.9	3.65	1.0
Ashland	78	17	50.8	1.66	
Barboursville	78	18	49.4	3.47	2.5
Bedford	75	19	48.4	3.86	1.0
Bigstone Gap	74	9	46.3	6.25	6.0
Birdsnest [2]	.....	.....	43.8	1.20	
Blacksburg	70	13	42.2	3.42	2.0
Bonair	77	15	48.8	2.54	
Burkes Garden	64	8	40.0	5.08	6.0
Callaville	75	18	48.7	2.59	
Charlottesville	80	17	48.6	3.51	4.0
Clarksville	.....	.....	.....	1.40	T.
Cliftonforge	74	.....	.....	3.35	5.0
Columbia	81	16	49.7	2.70	1.0
Dale Enterprise	74	9	43.0	4.86	18.0
Danville	.....	.....	.....	3.51	
Fredericksburg	76	20	49.6	2.72	1.0
Freeling	65	9	43.9	5.48	3.5
Grahams Forge [4]	70	13	45.0	3.37	2.1
Hampton	73	20	50.0	1.48	
Hot Springs	73	11	42.5	3.63	10.0
Lexington	74	18	46.1	2.99	5.0
Lincoln	76	15	44.8	3.46	8.0
Newport News	75	20	52.6	2.10	
Petersburg	81	17	50.9	2.60	T.
Quantico	79	18	48.2	.....	.....
Radford	.....	.....	.....	2.20	2.0
Riverton	.....	.....	.....	2.76	1.2
Roanoke	76	18	48.4	2.88	2.3
Salem	.....	.....	.....	2.83	2.0
Shenandoah	.....	.....	.....	3.92	16.5
Speers Ferry	.....	.....	.....	7.06	5.0
Spottsville	75	19	50.0	1.81	
Stanardsville	70	10	42.6	3.40	8.0
Staunton	73	12	45.3	2.61	13.0
Stephens City	75[j]	13[j]	45.4[j]	4.75	18.0
Warsaw	77	16	47.0	2.13	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
Virginia—Cont'd.					
Westpoint	72	14	47.8	1.38	
Williamsburg	73	17	48.8	0.97	
Woodstock	75	10	44.5	3.41	15.1
Wytheville	69	13	44.0	3.51	3.0
Washington.					
Aberdeen	60	28	41.7	10.97	0.5
Anacortes				3.06	2.9
Ashford				8.63	10.5
Bremerton	65	28	44.4	5.13	
Brinnon	61	31	43.3	9.33	0.1
Cedonia	58	15	35.2	0.98	3.0
Centralia	64	25	43.4	5.57	0.5
Cheney				1.04	3.0
Clearwater		31		17.28	1.5
Cle Elum	57	19	37.2	2.01	3.5
Colfax	65	18	39.6	0.71	
Colville	65	15	38.0	0.76	1.0
Conconully	58	14	35.5	1.46	7.0
Coupeville	64	30	43.2	2.36	1.5
Crescent	61	18	37.8	0.70	1.4
East Sound	56	25	41.0	4.04	
Ellensburg	62	16	39.6	0.43	
Ellensburg (near)	62	14	38.3	0.10	0.5
Grandmound	61	22	43.0	6.03	1.0
Granite Falls				9.64	T.
Hooper	71	17	43.2	0.08	
Ilwaco	62	31	44.8	9.92	
Lacenter	64	30	43.0	7.63	0.8
Lakeside	59	27	41.2	0.45	
Lind	58	20	40.8	0.63	1.0
Loomis	60	21	41.1	0.09	T.
Mayfield	64	30	43.4	9.15	
Mottinger Ranch	68	24	48.4	0.12	
Mount Pleasant	59	31	43.3	6.37	
Moxee Valley	68	17	42.6	0.50	T.
Northport	58	15	39.2	0.36	0.4
Olga	56	32	42.8	3.36	0.5
Olympia	61	27	44.6	6.78	T.
Pasco	70	16	47.0	0.03	
Pinehill	61	25	43.7	1.49	0.3
Pomeroy	68	21	42.7	0.65	1.0
Port Townsend	68	31	43.8	2.78	5.0
Pullman	60	20	38.4	1.26	4.4
Republic	64	15	35.8	1.46	
Ritzville				0.41	T.
Rosalia	61	15	37.4	0.76	1.6
Sedro	67	28	44.6	6.24	
Snohomish	67	27	43.8	5.17	8.0
Snoqualmie	65	28	43.5	7.75	T.
Southbend	66	30	43.9	12.58	
Sprague				0.50	5.0
Stampede				4.00	33.0
Sunnyside	63	18	43.5	0.17	T.
Union	61	27	42.8	8.56	T.
Usk	57	13	34.6	0.98	6.8
Vancouver	65	28	45.6	4.76	
Waterville	51	18	34.9	0.08	
Wenatchee (near)	59	22	39.6	1.30	8.5
Whatcom	60	25	44.0	2.89	0.8
Wilbur	58	18	36.6	0.66	0.5
West Virginia.					
Beckley	62	5	39.6		14.0
Beverly	73	6	40.9	5.33	24.0
Bluefield	68	7	43.6	4.51	16.0
Buckhannon	75	−1	41.8	4.29	14.5
Burlington	70	9	39.6	4.40	22.0
Byrne	78	10	46.6	4.70	21.0
Central	76	−4	42.9	3.00	13.5
Charleston				4.59	19.3
Creston				3.93	
Cuba	75	−5	44.7	3.19	10.0
Dayton	76	−1	42.9	3.07	12.2
Elkhorn	70	10	45.9	3.16	6.6
Fairmont				4.18	16.5
Foster	70	10	43.1		
Glenville	76	−2	42.8	4.28	13.7
Grafton	74	5	43.8	5.14	19.8
Green Sulphur	71	10	41.4	3.30	9.0
Harpers Ferry				6.14	16.0
Hinton *a*				4.32	12.5
Hinton *b*	72	13	44.4		
Huntington	76	8	42.6	3.82	14.5
Josiah	76	9	43.7	4.29	15.0
Lewisburg	70	6	41.3	3.77	7.2
Logan	80	4	47.5	4.15	17.0
Magnolia	70	11	42.9	4.45	19.0
Martinsburg	76	15	43.6	5.75	20.0
Morgantown	72	8	44.3	3.92	20.0
Moscow	70	6	42.4	3.73	9.0
New Martinsville	77	6	45.5	3.71	10.5
Nuttallburg	75	7	44.6	3.90	12.0
Oceana	73	4	45.2	5.38	
Oldfields	72	12	44.8	5.09	22.0
Point Pleasant	75	12	46.6	3.56	12.0
Powellton	78	7	46.2	4.23	13.9
Romney	70	11	43.1	4.24	22.0
Rowlesburg				4.42	16.0
Terra Alta	66	3	39.0	5.20	20.0

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
West Virginia—Cont'd.					
Uppertract	72	8	42.9	3.68	22.5
Wellsburg	69	8	41.6	3.32	12.5
Weston *a*				4.44	13.1
Weston *b*	78	0	44.8		
Wheeling *a*				3.46	7.0
Wheeling *b*	76	14	48.2	4.71	16.5
Williamson	79	8	46.1	6.29	20.5
Wisconsin.					
Amherst	59	−1	35.4	1.00	
Antigo	60	−6	34.0	0.20	T.
Appleton	64	0	35.2	1.72	4.0
Ashland				0.45	2.0
Barron	64	−8	34.8	0.86	1.6
Beloit	66	2	39.0	1.49	T.
Brodhead	66	−6	38.6	1.44	T.
Butternut	60	10	32.6	2.09	9.0
Chilton	64	−2	34.6	2.23	7.0
Darlington	64	−3	35.2	1.54	3.0
Dodgeville	65	−5	35.8		
Easton	65	−8	35.8	1.33	2.5
Eau Claire	65	−5	37.7	1.51	3.7
Florence	61	0	33.6	1.33	1.0
Fond du Lac	65	0	38.4	0.52	1.0
Grand River Locks				2.57	2.0
Grantsburg	64	−7	32.5	0.75	4.5
Harvey	64	−1	37.0	0.93	0.8
Hayward	65	−10	35.0	0.40	1.0
Hillsboro	61	−5	35.8	1.65	1.5
Knapp	75	0	39.9	0.30	1.0
Koepenick	66	−8	35.1	0.90	4.0
Ladysmith	61	−6	34.8	1.55	4.5
Lancaster	63	−5	37.8	1.49	T.
Madison	60	3	36.4	0.60	T.
Manitowoc	66	3	35.6	2.05	4.0
Meadow Valley	66	−4	35.6	1.06	2.0
Medford	64	−8	35.1	1.70	2.0
Menasha				1.30	2.5
Neillsville	68	−5	37.0	1.73	2.0
New Holstein	67	−1	37.0		
New London	65	−1	35.5	1.33	T.
North Crandon	61[e]	−5[e]	31.1[e]	1.52	3.0
Oconto	66	3	37.0	1.26	1.0
Osceola	63	−8	34.1	0.80	2.0
Oshkosh	67[j]	−3	27.8[e]	2.40	2.0
Pepin	68	−6	36.4	1.31	1.0
Pine River	67	−3	36.0	1.19	2.8
Portage	68	−1	37.8	1.11	2.0
Port Washington	68	−3	35.1	1.58	2.0
Prairie du Chien *a*	69	−2	40.0	2.39	T.
Prairie du Chien *b*				2.40	T.
Prentice	62	−6	33.2	0.73	6.5
Racine	68	4	38.4	2.61	
Sheboygan	66	2	36.6	2.23	1.5
Stevens Point	63	−3	36.4	1.10	T.
Viroqua	62	−6	36.9	2.39	1.5
Watertown	64	−1	36.7	1.15	3.0
Waukesha	64	0	37.0	1.33	7.1
Waupaca	64	−1	35.6	0.98	T.
Wausau	61	−6	35.2	1.28	
Wausaukee	64	1	36.8	0.40	T.
Westfield	64	−1	36.2	1.20	1.0
Whitehall	64	−4	37.8	1.45	1.8
Wyoming.					
Alcova	60	6	34.7	0.57	6.0
Basin	59	8	36.3	0.27	0.3
Bedford	56	−12	28.3	2.23	22.3
Border	49	−9	24.6	1.93	12.3
Buffalo	59	−5	32.0	0.24	1.8
Casper [j]	57	3	35.5	0.49	
Centennial	54[g]	0[g]	23.8[g]	0.35[e]	
Chugwater	62	7	34.3	2.15	6.0
Daniel	40	−19	15.6	1.10	11.0
Diamondville	53	−10	24.0	0.81	8.4
Embar	64	7	38.4	0.68	5.0
Evanston	42	−10	23.6	1.24	12.0
Fort Laramie	68	0	35.8	1.81	
Fort Washakie	58	−9	32.4	1.15	10.3
Fort Yellowstone	44	−2	25.0	2.46	24.6
Fourbear	51	−11	25.6	0.64	10.4
Griggs	59	1	32.8	0.41	0.6
Hyattville	57	6	33.6	1.20	12.0
Irma	58	−1	32.6	0.10	1.0
Iron Mountain	58	8	31.2	0.47	
Kimball Ranch	59	−2	34.7[e]	0.26	2.6
Laramie	52	3	27.5	0.41	5.5
Leo	49	−8	26.4	0.70	9.5
Lovell [g]	57	5	33.0	T.	T.
Lusk	57	−3	31.4	0.98	9.8
Moore	58	10	32.3	0.53	3.8
Parkman	57	−8	29.6	0.69	13.0
Pinebluff	63	8	34.8	0.40	4.0
Rawlins	49	13	31.4	1.19	11.9
Red Bank	53	2	30.6	2.19	19.0
Saratoga	55	−4	28.3	2.10	18.5
Thayne	49	−10	26.6	1.46	16.7
Thermopolis	61	4	35.8	0.22	2.0
Cuba.					
Aguacate	96	49	76.3	0.22	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
Cuba—Cont'd.					
Australia	92	50	74.5	0.95	
Banaguises	97	52	75.5	1.45	
Batabano	90	48	73.4	0.76	
Calimete	90	56	76.1	1.75	
Camajuani	103	46	73.4	0.92	
Ciego de Avila				2.17	
Cruces				0.17	
Gibara				1.51	
Guabairo				0.41	
Guanajay	88	48	72.4	3.03	
Guantánamo	93	56	75.6	1.82	
Holguin	93	57	75.4	1.48	
Los Canos	94	52	73.6	0.78	
Manzanillo				9.15	
Matanzas	91	49	72.2	1.15	
Moron Trocha	94	51	73.6	0.00	
Pinar del Rio	89	53	74.4	1.30	
San Cayetano	94	50	75.0	0.95	
Sancti Spiritus	88	55	73.4	1.60	
Santa Clara	95	42	74.8	0.44	
Santa Cruz del Sur				2.02	
San Vincente				0.56	
Soledad	88	50	72.4	0.57	
Yaguajay	95	54	75.0	0.71	
Porto Rico.					
Adjuntas	91	51	69.4	0.92	
Aguadilla	87	65	76.1	0.31	
Aguirre	87	62	76.0	1.12	
Arecibo	90	54	74.8	5.01	
Barros	92	51	71.6	3.45	
Bayamon	94	59	75.6	2.77	
Caguas	90	53	71.0	4.81	
Canovanas	88	65	76.4	6.47	
Cayey	95	51	73.7	3.25	
Coamo	92	60	76.1	0.71	
Corozal	89	53	70.8	4.13	
Fajardo	91	64	77.2	2.60	
Guanica	90	60	76.5	0.35	
Guayama				0.89	
Hacienda Coloso	88	56	70.9	0.22	
Hacienda Perla	89	63	74.7	7.69	
Humacao	87	67	77.4	4.50	
Isabela	87	64	76.2	2.34	
Juana Diaz	91	62	77.1	0.36	
La Isolina	87	59	72.2	3.72	
Las Marias	91	61	75.5	2.60	
Manati	91	61	75.1	5.10	
Maunabo	90	65	78.4	2.88	
Mayaguez	94	59	77.0	0.13	
Ponce	87	59	75.2	0.07	
Rio Piedras				2.19	
San German	89	61	76.0	3.11	
San Lorenzo	93	55	73.9	3.22	
San Salvador	85	57	71.0	1.68	
Santa Isabel	90	60	75.8	0.35	
Utuado	93	55	74.2	1.72	
Vieques	88	70	79.9	4.65	
Yauco	85	59	73.7	0.65	
Mexico.					
Ciudad P. Diaz	90	38	67.4	0.15	
Coatzacoalcos	94	49	75.6	0.80	
Leon de Aldamas	85	41	63.9	0.70	
Vera Cruz	85	61	75.6	T.	
New Brunswick.					
St. John	50	8	35.3	10.95	12.0
Isthmus of Panama.					
Alhajuela				0.39	
La Boca	91	72	81.9	3.11	

Late reports for February, 1902.

Stations.	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Alaska.					
Fort Egbert	38	−49	5.4	T.	T.
Fort Liscum	42	6	24.4	1.28	19.5
Orca	46	25	35.0	7.25	6.0
Arizona.					
Fort Apache	74	13	39.8	1.35	
California.					
San Miguel Island	66	42	51.8	7.00	
Yuba City *[b]	68	34	54.2	7.72	
Georgia.					
Greenbush	65	13[d]	37.7	6.96	5.0
Indiana.					
Winamac [e]	53	−20	19.4		
Iowa.					
Cresco	48	−16	13.3	1.63	5.0
Michigan.					
Westbranch	51	−6	19.8	1.33	7.5
Montana.					
Kipp	65	−25	20.9	0.70	7.0
Missoula	49	−8	28.2	0.64	6.5
Toston	75	−13	31.0	0.76	3.3
Nebraska.					
Dannebrog				0.32	3.2
Imperial	61	−12	29.6	0.42	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Ohio.	°	°	°	*Ins.*	*Ins.*
Bethany	55	− 5	23.2	1.14	......
Hillsboro	55	− 3	22.6	0.36	......
Thurman	59	0	25.9	1.12	0.8
Van Wert	57	−10	19.9	......	......
Oregon.					
Pine	53	2[e]	34.8	4.18	3.0
Pennsylvania.					
Athens	50	− 2	22.8	1.89	7.8
Tennessee.					
Dover	60	5	29.6	......[i]	......
Texas.					
Fort Clark	86	24	56.1	0.35	
Virginia.	°	°	°	*Ins.*	*Ins.*
Farmville *	44	4	30.2	2.25	10.0
Porto Rico.					
Juana Diaz	90	61	77.2	0.21	
San Lorenzo	90	55	74.9	0.28	
Vieques	88	67	77.0	1.75	

EXPLANATION OF SIGNS.

*Extremes of temperature from observed readings of dry thermometer.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. ÷ 4.
[2] Mean of 8 a. m. + 8 p. m. ÷ 2.
[3] Mean of 7 a. m. + 7 p. m. ÷ 2.
[4] Mean of 6 a. m. + 6 p. m. ÷ 2.
[5] Mean of 7 a. m. + 2 p. m. ÷ 2.
[6] Mean of readings at various hours reduced to true daily mean by special tables.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance "n" denotes 14 days missing.

CORRECTIONS.

February, 1902, Ohio, Cedarville, make total precipitation 1.05 instead of 1.35.

February, 1902, page 89, under head of maximum wind velocities, make Red Bluff read Sacramento.

NOTE.—The following changes have been made in names of stations: Lyons, Okla., changed to Ames.

TABLE III.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the month of March, 1902.*

Stations.	Component direction from— N.	S.	E.	W.	Resultant. Direction from—	Duration.
	Hours.	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
New England.						
Eastport, Me	22	18	15	15	n.	4
Portland, Me.	30	23	8	11	n. 23 w.	8
Northfield, Vt.	32	24	3	10	n. 41 w.	11
Boston, Mass	22	18	11	28	n. 77 w.	18
Nantucket, Mass	22	21	12	22	n. 84 w.	10
Block Island, R. I.	17	17	16	26	w.	10
New Haven, Conn.	29	17	10	19	n. 37 w.	15
Middle Atlantic States.						
Albany, N. Y	29	18	8	19	n. 45 w.	16
Binghamton, N. Y.†	15	5	8	11	n. 17 w.	10
New York, N. Y	22	16	11	26	n. 68 w.	15
Harrisburg, Pa.†	13	6	10	10	n.	7
Philadelphia, Pa	28	19	10	24	n. 57 w.	16
Scranton, Pa	32	17	14	13	n. 4 e.	15
Atlantic City, N. J.	21	21	7	28	w.	21
Cape May, N. J	20	21	8	24	s. 87 w.	16
Baltimore, Md	17	13	15	25	n. 68 w.	11
Washington, D. C	23	17	13	24	n. 61 w.	12
Lynchburg, Va	18	20	15	27	s. 81 w.	12
Norfolk, Va.	19	25	18	17	s. 9 e.	6
Richmond, Va	24	24	15	15	....	....
South Atlantic States.						
Charlotte, N. C.	13	29	16	20	s. 14 w.	16
Hatteras, N. C	19	20	20	18	s. 63 e.	2
Raleigh, N. C	20	21	12	24	s. 85 w.	12
Wilmington, N. C.	15	22	16	23	s. 45 w.	9
Charleston, S. C.	15	21	17	23	s. 45 w.	8
Columbia, S. C	13	17	23	21	s. 27 e.	4
Augusta, Ga.	19	17	17	23	n. 72 w.	6
Savannah, Ga	15	19	19	23	s. 45 w.	6
Jacksonville, Fla.	17	20	22	19	s. 45 e.	4
Florida Peninsula.						
Jupiter, Fla.	15	29	16	12	s. 16 e.	15
Key West, Fla	21	18	37	7	n. 84 e.	30
Tampa, Fla	16	17	24	17	s. 82 e.	7
Eastern Gulf States.						
Atlanta, Ga	18	24	15	19	s. 34 w.	7
Macon, Ga.†	9	10	8	10	s. 63 w.	2
Pensacola, Fla.†	11	9	10	6	n. 63 e.	4
Mobile, Ala	21	26	18	11	s. 54 e.	9
Montgomery, Ala	17	19	23	14	s. 77 e.	9
Meridian, Miss†	14	9	10	6	n. 39 e.	6
Vicksburg, Miss.	19	21	25	13	s. 81 e.	12
New Orleans, La	18	29	19	11	s. 36 e.	14
Western Gulf States.						
Shreveport, La	14	20	20	21	s. 9 w.	6
Fort Smith, Ark	14	11	29	21	n. 69 e.	8
Little Rock, Ark	13	20	22	20	s. 16 e.	7
Corpus Christi, Tex	16	19	31	9	s. 82 e.	22
Fort Worth, Tex	20	21	17	18	s. 45 w.	1
Galveston, Tex.	17	23	29	9	s. 73 e.	21
Palestine, Tex	25	20	18	10	n. 58 e.	10
San Antonio, Tex	25	16	26	10	n. 61 e.	18
Taylor, Tex.†	13	10	6	8	n. 34 w.	4
Ohio Valley and Tennessee.						
Chattanooga, Tenn.	16	22	18	18	s.	6
Knoxville, Tenn	23	14	14	22	n. 42 w.	12
Memphis, Tenn	19	17	26	16	n. 79 e.	10
Nashville, Tenn.	22	21	16	17	n. 45 w.	1
Lexington, Ky.†	8	9	13	10	s. 72 e.	3
Louisville, Ky	16	24	23	18	s. 40 e.	8
Evansville, Ind.†	8	11	10	6	s. 53 e.	5
Indianapolis, Ind	18	19	20	21	s. 45 w.	1
Cincinnati, Ohio	19	20	23	19	s. 76 e.	4
Columbus, Ohio.	18	16	17	21	n. 68 w.	5
Pittsburg, Pa	22	21	15	20	n. 79 w.	5
Parkersburg, W. Va.	19	15	17	21	n. 45 w.	6
Elkins, W. Va.	9	20	6	26	s. 61 w.	23
Lower Lake Region.						
Buffalo, N. Y.	12	22	15	27	s. 40 w.	16
Oswego, N. Y	20	21	13	19	s. 80 w.	6
Rochester, N. Y.	13	21	13	30	s. 65 w.	19
Erie, Pa.	14	20	11	31	s. 73 w.	21
Cleveland, Ohio	14	25	18	20	s. 10 w.	11
Sandusky, Ohio	9	10	9	14	s. 79 w.	5
Toledo, Ohio	14	19	17	25	s. 58 w.	9
Detroit, Mich	19	17	17	23	n. 68 w.	5
Upper Lake Region.						
Alpena, Mich	25	18	18	14	n. 30 e.	8
Escanaba, Mich	27	17	12	16	n. 23 w.	11
Grand Haven, Mich	20	20	20	17	e.	3
Houghton, Mich.†	3	8	14	8	s. 50 e.	8
Marquette, Mich	24	20	10	24	n. 74 w.	15
Port Huron, Mich.	23	22	14	19	n. 79 w.	5
Sault Ste. Marie, Mich	15	16	24	20	s. 76 e.	4
Chicago, Ill	18	22	19	17	s. 27 e.	4
Milwaukee, Wis.	23	18	14	19	n. 45 w.	7
Green Bay, Wis	23	19	20	16	n. 45 e.	6
Duluth, Minn	28	12	20	19	n. 3 e.	16
North Dakota.						
Moorhead, Minn	19	26	17	17	s.	7
Bismarck, N. Dak.	24	11	23	19	n. 17 e.	14
Williston, N. Dak.	30	18	13	12	n. 5 e.	12
Upper Mississippi Valley.						
St. Paul, Minn	17	27	18	16	s. 11 e.	10
La Crosse, Wis.†	9	12	10	6	s. 53 e.	5
Davenport, Iowa	11	14	24	24	s.	3
Des Moines, Iowa	16	17	23	20	s. 72 e.	3
Dubuque, Iowa.	23	19	21	17	n. 45 e.	6
Keokuk, Iowa.	16	18	22	17	s. 68 e.	5
Cairo, Ill.	19	21	21	17	s. 63 e.	4
Springfield, Ill	21	24	13	20	s. 67 w.	8
Hannibal, Mo.†	8	10	9	9	s.	2
St. Louis, Mo.	18	24	15	18	s. 27 w.	7
Missouri Valley.						
Columbia, Mo.*	10	9	10	9	n. 45 e.	1
Kansas City, Mo	20	25	17	17	s.	5
Springfield, Mo	16	22	23	19	s. 34 e.	7
Lincoln, Nebr.	22	22	23	15	e.	8
Omaha, Nebr.	19	15	24	17	n. 60 e.	8
Valentine, Nebr	24	16	9	28	n. 67 w.	21
Sioux City, Iowa†	9	12	10	9	s. 18 e.	3
Pierre, S. Dak.	25	13	23	14	n. 37 e.	15
Huron, S. Dak.	19	23	21	16	s. 51 e.	6
Yankton, S. Dak.†	8	10	9	12	s. 56 w.	4
Northern Slope.						
Havre, Mont	17	15	17	31	n. 82 w.	14
Miles City, Mont	29	14	11	21	n. 34 w.	18
Helena, Mont	11	24	6	36	s. 67 w.	33
Kalispell, Mont	7	22	13	32	s. 52 w.	24
Rapid City, S. Dak	29	11	14	24	n. 29 w.	21
Cheyenne, Wyo	27	11	6	34	n. 60 w.	32
Lander, Wyo.	21	22	15	20	s. 68 w.	5
North Platte, Nebr.	23	18	16	23	n. 54 w.	9
Middle Slope.						
Denver, Colo	25	19	12	19	n. 49 w.	9
Pueblo, Colo	23	11	16	26	n. 40 w.	16
Concordia, Kans	17	25	14	16	s. 14 w.	8
Dodge, Kans	22	19	17	21	n. 53 w.	5
Wichita, Kans	25	26	10	13	s. 72 w.	3
Oklahoma, Okla.	25	23	12	11	n. 27 e.	2
Southern Slope.						
Abilene, Texas.	14	28	20	18	s. 8 e.	14
Amarillo, Tex.	16	29	11	23	s. 43 w.	18
Southern Plateau.						
El Paso, Texas.	18	10	15	35	n. 68 w.	22
Santa Fe, N. Mex	23	15	15	21	n. 37 w.	10
Flagstaff, Ariz	18	16	10	33	n. 81 w.	13
Phoenix, Ariz.	17	14	25	27	s. 16 w.	7
Yuma, Ariz.	23	15	13	21	n. 45 w.	11
Independence, Cal	27	17	6	24	n. 61 w.	21
Middle Plateau.						
Carson City, Nev.	22	20	7	26	n. 84 w.	19
Winnemucca, Nev	16	13	14	25	n. 75 w.	11
Modena, Utah.	13	19	10	31	s. 74 w.	22
Salt Lake City, Utah	16	25	26	15	s. 51 e.	14
Grand Junction, Colo	23	11	19	24	n. 23 w.	13
Northern Plateau.						
Baker City, Oreg.	14	28	24	13	s. 38 e.	18
Boise, Idaho	17	15	25	20	n. 68 e.	5
Lewiston, Idaho†	2	10	20	5	s. 62 e.	17
Pocatello, Idaho.	4	33	18	24	s. 12 w.	30
Spokane, Wash.	11	35	14	16	s. 5 w.	24
Walla Walla, Wash.	5	47	4	13	s. 12 w.	43
North Pacific Coast Region.						
Neah Bay, Wash	2	18	24	26	s. 7 w.	16
Port Crescent, Wash.*	0	6	11	17	s. 45 w.	8
Seattle, Wash.	9	27	17	13	s. 15 e.	18
Tacoma, Wash	13	36	2	25	s. 45 w.	32
Astoria, Oreg	13	22	13	30	s. 62 w.	19
Portland, Oreg	9	36	10	21	s. 22 w.	29
Roseburg, Oreg.	4	24	14	28	s. 35 w.	24
Middle Pacific Coast Region.						
Eureka, Cal	20	24	17	13	s. 45 e.	6
Mount Tamalpais, Cal.	29	13	6	32	n. 58 w.	30
Red Bluff, Cal.	32	18	14	10	n. 16 e.	15
Sacramento, Cal.	16	26	18	14	s. 23 e.	11
San Francisco, Cal	14	12	5	46	n. 87 w.	41
South Pacific Coast Region.						
Fresno, Cal	32	8	13	29	n. 34 w.	29
Los Angeles, Cal	18	10	18	24	n. 37 w.	10
San Diego, Cal	23	9	15	29	n. 45 w.	18
San Luis Obispo, Cal	25	11	1	25	n. 60 w.	28
West Indies.						
Basseterre, St. Kitts Island.	22	5	45	2	n. 68 e.	46
Bridgetown, Barbados	21	4	53	0	n. 72 e.	56
Cienfuegos, Cuba.	2[illegible]	15	33	4	n. 68 e.	31
Grand Turk†	5	9	25	1	s. 81 e.	24
Havana, Cuba.	11	10	46	5	n. 89 e.	41
Kingston, Jamaica	....	....	....	....	....	....
Port of Spain, Trinidad	....	....	....	....	....	....
Puerto Principe, Cuba	26	3	44	3	n. 61 e.	47
Roseau, Dominica, W. I.	....	....	....	....	....	....
San Juan, Porto Rico	8	18	42	3	s. 76 e.	40
Santiago de Cuba, Cuba	40	16	12	1	n. 25 e.	26
Santo Domingo, W. I.	....	....	....	....	....	....
Willemstad, Curaçao	5	2	59	0	n. 87 e.	59

* From observations at 8 p. m. only.

† From observations at 8 a. m. only.

TABLE IV.—*Thunderstorms and auroras, March, 1902.*

States.	No. of stations.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total. No.	Total. Days.	
Alabama	52	T.	5				1		1	1			1	2	2	5	5	13				1	4			3	1	6	12	9	4			76	18	T.
		A.																																0	0	A.
Arizona	56	T.									1	3												1		1								6	4	T.
		A.																																0	0	A.
Arkansas	57	T.			5	3							7	6		1	1						2	1	1		2	13	9	13	6			70	14	T.
		A.																																0	0	A.
California	167	T.	1				1			5	1											4		4	3	2	1							22	9	T.
		A.																																0	0	A.
Colorado	81	T.		1								1										2		1	5	1	6			1				18	8	T.
		A.																																0	0	A.
Connecticut	21	T.	1	1											2																	1	1	6	5	T.
		A.																																0	0	A.
Delaware	5	T.																																0	0	T.
		A.																																0	0	A.
Dist. of Columbia	4	T.																														1		1	1	T.
		A.																																0	0	A.
Florida	47	T.	10	6										3	6	3	6	5	4			1	6		2	2	1					2		57	13	T.
		A.																																0	0	A.
Georgia	55	T.	14											5		3	14	16	2								1		2	12	16			85	10	T.
		A.																																0	0	A.
Idaho	34	T.																									1							1	1	T.
		A.																																0	0	A.
Illinois	92	T.							5	2		12	8	17	1	1	10	2									1	16	4	8	13	5		105	15	T.
		A.																																0	0	A.
Indiana	58	T.							1			1	8	19			2	3											1	5	7	25	1	73	11	T.
		A.			1											1																		2	2	A.
Indian Territory	11	T.										2	6				1					1					3	1		2	1			17	8	T.
		A.																																0	0	A.
Iowa	149	T.	1								2	42	21	3		3	22									2	3	19		1		1		120	12	T.
		A.												1				1													1			3	3	A.
Kansas	77	T.										1	1									3			5		3							13	5	T.
		A.																																0	0	A.
Kentucky	41	T.	2		1				2	2				12	1		1	7										2	1	11	4	6		52	13	T.
		A.																																0	0	A.
Louisiana	46	T.				2			1				3	6		10	5	1				2	3	1	7	2	4	4	4	5				60	17	T.
		A.																																0	0	A.
Maine	19	T.	4	7																														11	2	T.
		A.																																0	0	A.
Maryland	48	T.	1				2							2	3			1	1												6	39	2	57	9	T.
		A.																																0	0	A.
Massachusetts	48	T.	1										1																					2	2	T.
		A.																																0	0	A.
Michigan	106	T.										2	10	15							1			1			1	1				4		35	8	T.
		A.																										1		1				2	2	A.
Minnesota	67	T.										2					4										1	7						14	4	T.
		A.																																0	0	A.
Mississippi	44	T.	1		1	3							1	7	2	10	7	7				3	4		7	2	2	19	19	14	1			110	18	T.
		A.																																0	0	A.
Missouri	95	T.						1	3	4		18	15	11			15		1			1				2	3	29	3	22	21	4		153	16	T.
		A.																																0	0	A.
Montana	40	T.																																0	0	T.
		A.											2																					2	1	A.
Nebraska	142	T.		1							3	35	11	1		7	14		1			1	1	2	4	5	31	6		1	1	1		126	18	T.
		A.										1																					1	2	2	A.
Nevada	40	T.																				2												2	1	T.
		A.																																0	0	A.
New Hampshire	19	T.	2																															2	1	T.
		A.																																0	0	A.
New Jersey	51	T.	6				3			1					10	1															30	6		57	7	T.
		A.																																0	0	A.
New Mexico	31	T.									1	1		2	1									1	1									7	6	T.
		A.																																0	0	A.
New York	99	T.	16										1	2		1		2	1										2	1		7	3	36	10	T.
		A.																							1									1	1	A.
North Carolina	56	T.	5	2		1				1				4	1		1	20	3	1			1	1					1	15	18			75	15	T.
		A.																																0	0	A.
North Dakota	48	T.															1						1	3		1	6	2			1			15	7	T.
		A.											1																					1	1	A.
Ohio	128	T.	6										3	28	3		2	1											2	1	2	53	2	103	11	T.
		A.																																0	0	A.
Oklahoma	23	T.	1	2									1					1	2	*1		2					1					9	10	30	10	T.
		A.																	1															1	1	A.
Oregon	74	T.				3													1												1	1	1	7	5	T.
		A.																																0	0	A.
Pennsylvania	91	T.	7											7	2			1	1											1	7	12	2	40	9	T.
		A.																																0	0	A.
Rhode Island	7	T.																																0	0	T.
		A.																																0	0	A.
South Carolina	46	T.	9										1	3			3	12	1										1	6	17			53	9	T.
		A.												1																				1	1	A.
South Dakota	56	T.														5							3				6	1						15	4	T.
		A.											3																				1	4	2	A.
Tennessee	56	T.	3			4			1	7			1	12	4		8	12										9	1	25	4	2		93	14	T.
		A.											1																					1	1	A.
Texas	95	T.			1	1						3	26	5								7		1	9	6	1	2	12	13				87	13	T.
		A.																																0	0	A.
Utah	47	T.																					1	1										2	2	T.
		A.																																0	0	A.
Vermont	16	T.																																0	0	T.
		A.																																0	0	A.
Virginia	50	T.	2											3	2			2												5	2	14		30	7	T.
		A.																																0	0	A.
Washington	64	T.				2									3																			5	2	T.
		A.										1																						1	1	A.
West Virginia	43	T.	2										1	4	12			4												1	7	20		51	9	T.
		A.													1																			1	1	A.
Wisconsin	60	T.										7	8				3					1					1							20	5	T.
		A.																																0	0	A.
Wyoming	31	T.		1																		1	3	3	3	2	2							15	7	T.
		A.																																0	0	A.
Sums	2,893	T.	100	21	8	19	7	1	14	23	8	130	135	179	55	50	125	110	18	2	1	32	29	21	47	31	82	137	74	172	169	213	22	2,035	....	T.
		A.	0	0	1	0	0	0	0	0	0	2	7	2	1	1	0	1	1	0	0	0	0	0	1	0	0	1	0	1	1	0	2	22	....	A.

TABLE V.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded 0.25 in any 5 minutes, or 0.75 in 1 hour during March, 1902, at all stations furnished with self-registering gages.*

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Albany, N. Y	2			0.81														*			
Alpena, Mich	12			0.66														*			
Atlanta, Ga	12	3:25 p. m.	5:00 p. m.	0.76	3:30 p. m.	3:50 p. m.	0.02	0.08	0.22	0.40	0.53	0.57	0.61	0.64	0.66						
Atlantic City, N. J	4-5			2.03														0.71			
Baltimore, Md	28-29			0.90														0.24			
Binghamton, N. Y	5			0.83														*			
Bismarck, N. Dak	25-26			1.08														*			
Boise, Idaho	2			0.24														0.11			
Boston, Mass	16-17			0.70														0.35			
Buffalo, N. Y	28-29			0.45														0.08			
Cairo, Ill	26			0.55														0.35			
Charleston, S. C	16	1:19 p. m.	7:36 p. m.	2.07	2:17 p. m.	2:35 p. m.	0.05	0.16	0.34	0.44	0.51										
					3:15 p. m.	4:15 p. m.	0.69	0.13	0.32	0.50	0.69	0.75	0.85	0.98	1.01	1.06	1.12	1.22			
Charlotte, N. C	29			0.81														0.42			
Chattanooga, Tenn	28	3:25 p. m.	11:59 p. m.	1.39	7:15 p. m.	7:40 p. m.	0.08	0.04	0.27	0.64	0.82	0.90	0.92								
Chicago, Ill	11-12			2.09														*			
Cincinnati, Ohio	28			0.43														0.15			
Cleveland, Ohio	11			0.53														0.19			
Columbia, Mo	11-12			1.62														0.33			
Columbia, S. C	29	3:00 a. m.	10:20 a. m.	1.96	3:24 a. m.	4:00 a. m.	0.09	0.28	0.50	0.63	0.71	0.82	0.91	0.99	1.02	1.06	1.11	1.18			
Columbus, Ohio	12			0.29														0.26			
Corpus Christi, Tex	11			0.04										0.04							
Davenport, Iowa	11-12			0.99														*			
Denver, Colo	28-29			0.42														*			
Des Moines, Iowa	10-11			0.25														0.24			
Detroit, Mich	30			0.46														0.32			
Dodge, Kans	20-21			0.90														*			
Duluth, Minn	15-16			0.19														*			
Eastport, Me	17-18			2.69														0.29			
Elkins, W. Va	16			0.46														0.31			
Erie, Pa	28-29			0.16														0.07			
Escanaba, Mich	15			0.31														0.14			
Evansville, Ind	28			0.64														0.39			
Fort Smith, Ark	26	1:42 a. m.	4:57 a. m.	1.47	2:35 a. m.	3:35 a. m.	0.11	0.09	0.11	0.20	0.25	0.40	0.55	0.74	0.94	1.09	1.13	1.28			
Fort Worth, Tex	11			1.50														*			
Galveston, Tex	11-12			0.50														0.46			
Grand Junction, Colo	14			0.16														0.08			
Green Bay, Wis	10-11			1.21														*			
Harrisburg, Pa	30			0.28														0.27			
Hatteras, N. C	8-9			0.68														0.35			
Helena, Mont	2-3			0.18														*			
Huron, S. Dak	25-26			0.82														0.17			
Indianapolis, Ind	15-16			0.68														0.37			
Jacksonville, Fla	16	4:55 p. m.	11:59 p. m.	1.30	5:30 p. m.	6:15 p. m.	0.01	0.07	0.38	0.49	0.56	0.60	0.62	0.65	0.71	0.75	0.79	0.83			
Jupiter, Fla	2			0.34						0.26											
Kalispell, Mont	14			0.12														*			
Kansas City, Mo	26			0.44														0.26			
Key West, Fla	5			0.16														0.10			
Knoxville, Tenn	28-29			2.76														0.53			
La Crosse, Wis	10-11			0.52														0.11			
Lewiston, Idaho	20-21			0.41														0.12			
Lexington, Ky	12			0.78														0.45			
Lincoln, Nebr	14-15			0.12														0.09			
Little Rock, Ark	25-26			1.37														0.75			
Los Angeles, Cal	2			0.95														0.30			
Louisville, Ky	28-29			0.50														0.11			
Macon, Ga	16	12:05 a. m.	12:30 p. m.	2.12	9:40 a. m.	10:05 a. m.	0.98	0.19	0.27	0.41	0.79	0.88	0.90								
Memphis, Tenn	26	D. N.	11:55 a. m.	1.78	9:40 a. m.	10:30 a. m.	0.59	0.07	0.12	0.16	0.19	0.25	0.43	0.61	0.76	1.01	1.09				
Meridian, Miss	26-27	7:35 p. m.	D. N.	2.77	7:38 p. m.	9:10 p. m.	T.	0.24	0.41	0.50	0.58	0.64	0.73	0.81	0.84	0.91	0.95	1.11	1.24	1.54	1.72
	27-28	8:40 p. m.	D. N.	1.02	9:30 p. m.	9:55 p. m.	0.07	0.08	0.22	0.51	0.81	0.90									
Milwaukee, Wis	11-12			1.27														0.17			
Montgomery, Ala	16	5:16 a. m.	9:26 a. m.	1.59	6:20 a. m.	6:55 a. m.	0.13	0.15	0.33	0.54	0.62	0.77	0.94	1.04							
Nantucket, Mass	17-18			1.34														0.29			
Nashville, Tenn	28			3.67														0.47			
New Haven, Conn	8-9			1.63														0.20			
New Orleans, La	14	D. N.	9:15 p. m.	3.11	2:00 p. m.	2:35 p. m.	1.53	0.08	0.19	0.37	0.55	0.61	0.76	0.81							
New York, N. Y	6			0.65														0.21			
Norfolk, Va	17	2:30 a. m.	8:15 p. m.	1.22	4:48 a. m.	5:45 a. m.	0.34	0.11	0.22	0.33	0.38	0.48	0.55	0.60	0.67	0.71	0.74	0.81			
Northfield, Vt	2-3			1.65														0.23			
Oklahoma, Okla	25	7:20 p. m.	11:00 p. m.	1.34	8:00 p. m.	8:55 p. m.	0.03	0.09	0.39	0.42	0.42	0.44	0.46	0.46	0.55	0.89	1.07	1.13			
Omaha, Nebr	11			0.19					0.19												
Parkersburg, W. Va	12			0.55														0.38			
Philadelphia, Pa	28-29			0.62														0.21			
Pittsburg, Pa	5			1.50														*			
Pocatello, Idaho	19			0.22														*			
Portland, Me	9			1.79														0.36			
Portland, Oreg	4-5			1.98														0.21			
Pueblo, Colo	28-29			0.48														*			
Raleigh, N. C	5			0.38														0.30			
Richmond, Va	5			0.54														0.26			
Rochester, N. Y	28-29			0.38														0.09			
St. Louis, Mo	28			1.62														0.65			
St. Paul, Minn	10-11			0.19														0.05			
Salt Lake City, Utah	21			0.24														*			
San Diego, Cal	2			0.40														0.25			
Sandusky, Ohio	28-29			0.84														0.14			
San Francisco, Cal	5-6			0.76														0.33			
Savannah, Ga	14-15			2.52														0.66			
Scranton, Pa	5-6			1.28														*			
Seattle, Wash	7-8			1.07														0.13			
Spokane, Wash	6-7			0.20														*			
Springfield, Ill	12			0.67														0.58			
Tampa, Fla	17	10:29 a. m.	3:10 p. m.	0.60	1:05 p. m.	1:12 p. m.	0.01	0.51	0.57												
Toledo, Ohio	28-29			1.12														0.22			
Topeka, Kans	20-21			0.51														*			
Valentine, Nebr	23			0.65														*			
Vicksburg, Miss	26	2:00 p. m.	9:00 p. m.	1.12	6:57 p. m.	7:15 p. m.	0.25	0.25	0.69	0.70	0.73										
	27	12:15 a. m.	10:40 p. m.	6.40	6:00 a. m.	6:50 a. m.	1.03	0.24	0.64	0.71	0.80	1.06	1.25	1.53	1.83	1.86	1.97				
					6:50 a. m.	7:40 a. m.		2.16	2.50	2.75	2.77	2.78	2.94	3.11	3.14	3.16	3.22				
					7:40 a. m.	8:50 a. m.		3.30	3.33	3.37	3.43	3.64	3.77	3.83	3.97	4.09	4.14	4.17	4.53		
	28	2:00 a. m.	9:30 a. m.	1.10	4:47 a. m.	5:20 a. m.	0.04	0.18	0.27	0.41	0.58	0.69	0.76	0.86	0.87						
Washington, D. C	4-5			1.37														0.25			

TABLE V.—*Accumulated amounts of precipitation for each 5 minutes, etc.*—Continued.

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Wilmington, N. C.	29	......	......	1.26	......	......	......	......	......	......	......	......	......	......	......	......	......	0.48	......	......	......
Yankton, S. Dak	25-26	......	......	0.21	......	......	......	......	......	......	......	......	......	......	......	......	......	0.16	......	......	......
Basseterre, St. Kitts	8	......	......	1.14	......	......	......	......	......	......	0.46	......	......	......	......	......	......	......	......	......	......
Bridgetown, Barbados	20	......	......	0.20	......	......	......	......	......	......	......	......	......	......	0.19	......	......	......	......	......	......
Cienfuegos, Cuba	11	1:26 p. m.	3:48 p. m.	3.11	2:05 p. m.	2:55 p. m.	0.26	0.08	0.38	0.78	1.04	1.20	1.37	1.40	1.57	1.74	1.82	......	......	......	......
					2:55 p. m.	3:20 p. m.	......	1.84	1.91	2.23	2.56	2.73	2.77	2.79	2.82	2.86	......	......	......	......	......
Havana, Cuba	5	......	......	0.73	......	......	......	......	......	......	......	......	......	......	......	......	......	0.54	......	......	......
Puerto Principe, Cuba	10	......	......	0.28	......	......	......	......	......	......	......	......	......	......	......	......	......	0.25	......	......	......
San Juan, Porto Rico	20-21	......	......	1.95	......	......	......	......	......	......	......	......	......	......	......	......	......	0.67	......	......	......
Santiago de Cuba	9	3:29 p. m.	4:15 p. m.	0.63	3:36 p. m.	4:10 p. m.	T.	0.04	0.13	0.24	0.33	0.49	0.60	0.62	......	......	......	......	......	......	......
	12	2:48 p. m.	3:52 p. m.	0.56	2:48 p. m.	3:20 p. m.	0.00	0.10	0.24	0.40	0.45	0.50	0.54	0.56	......	......	......	......	......	......	......
Willemstad, Curaçao	29	10:01 a. m.	5:15 p. m.	1.64	3:28 p. m.	3:45 p. m.	0.70	0.26	0.38	0.47	0.50	0.53	0.57	0.58	0.66	0.68	......	......	......	......	......

*Self register not working.

TABLE VI.—*Data furnished by the Canadian Meteorological Service, March, 1902.*

Stations.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Pressure. Sea level, reduced to mean of 24 hours.	Pressure. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Temperature. Mean maximum.	Temperature. Mean minimum.	Precipitation. Total.	Precipitation. Departure from normal.	Precipitation. Depth of snow.
	Ins.	Ins.	Ins.	°	°	°	°	Ins.	Ins.	Ins.
St. Johns, N. F.	29.77	29.91	+.03	34.5	+ 6.8	41.0	27.9	2.89	−1.87	2.7
Sydney, C. B. I	29.94	29.98	+.10	35.2	+ 9.0	41.4	29.1	5.13	+0.20	6.5
Halifax, N. S	29.83	29.94	.00	38.1	+ 9.1	45.0	31.2	7.76	+2.30	T.
Grand Manan, N. B.	29.86	29.91	−.02	37.0	+ 7.2	42.2	31.8	11.97	+7.69	18.7
Yarmouth, N. S.	29.85	29.92	−.03	38.2	+ 7.4	44.5	31.8	10.75	+5.90	1.3
Charlottetown, P. E. I.	29.90	29.94	+.04	34.2	+ 8.8	40.2	28.2	3.18	−0.03	11.0
Chatham, N. B	29.91	29.93	+.03	32.4	+ 9.3	41.1	23.6	8.09	+4.62	19.8
Father Point, Que	29.94	29.96	+.06	28.3	+ 8.0	35.3	21.3	4.25	+1.52	10.9
Quebec, Que	29.62	29.96	.00	31.0	+ 9.8	37.5	24.5	5.68	+2.42	7.6
Montreal, Que	29.74	29.96	−.04	34.3	+10.5	40.9	27.8	6.61	+2.82	9.4
Bissett, Ont.	29.39	30.02	+.01	31.9	+12.9	43.7	20.0	3.18	+1.12	2.2
Ottawa, Ont	29.68	30.02	+.01	34.2	+12.7	42.3	26.1	3.47	+0.75	3.3
Kingston, Ont	29.64	29.96	−.05	35.1	+ 9.5	42.8	27.4	2.59	−0.05	1.2
Toronto, Ont.	29.58	29.97	−.05	37.4	+10.1	44.6	30.2	2.53	−0.11	3.4
White River, Ont.	28.64	30.00	−.03	24.2	+12.0	38.0	10.4	1.17	−0.21	4.8
Port Stanley, Ont.	29.34	29.99	−.04	35.5	+ 8.3	42.4	28.6	2.82	−0.06	1.6
Saugeen, Ont	29.23	29.95	−.08	35.1	+10.4	43.4	26.8	3.64	+0.99	5.0

Stations.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Pressure. Sea level, reduced to mean of 24 hours.	Pressure. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Temperature. Mean maximum.	Temperature. Mean minimum.	Precipitation. Total.	Precipitation. Departure from normal.	Precipitation. Depth of snow.
	Ins.	Ins.	Ins.	°	°	°	°	Ins.	Ins.	Ins.
Parry Sound, Ont.	29.26	29.96	−.06	35.1	+14.0	45.7	24.5	4.79	+2.56	6.6
Port Arthur, Ont	29.25	29.98	−.07	27.5	+10.7	35.8	19.3	0.40	−0.57	0.4
Winnipeg, Man.	......	......	......	......	......	......	......	......	......	......
Minnedosa, Man.	28.07	29.95	−.11	23.5	+11.0	32.6	14.4	2.58	+1.93	8.7
Qu'Appelle, Assin	27.50	29.91	−.13	20.2	+ 5.3	28.0	12.3	3.52	+2.75	30.1
Medicine Hat, Assin.	27.58	29.90	−.10	31.2	+ 3.7	43.0	19.3	0.20	−0.56	1.5
Swift Current, Assin.	27.29	29.94	−.08	25.4	+ 3.4	33.5	17.4	1.38	+0.57	13.8
Calgary, Alberta	26.24	29.88	−.07	25.9	− 0.3	37.5	14.3	0.62	−0.10	6.2
Banff, Alberta	25.17	29.89	−.05	22.6	+ 2.4	34.1	11.1	1.37	−0.04	13.7
Edmonton, Alberta	27.53	29.88	−.08	21.9	− 2.3	32.1	11.8	0.22	−0.50	2.2
Prince Albert, Sask	28.32	29.94	−.14	16.9	+ 4.9	27.0	6.9	1.05	+0.28	5.5
Battleford, Sask	28.17	29.97	−.09	17.8	+ 4.7	27.2	8.4	1.15	+0.69	4.8
Kamloops, B. C	......	......	......	......	......	......	......	......	......	......
Victoria, B. C.	29.84	29.94	−.03	43.5	+ 1.6	48.1	38.8	2.27	−0.85	1.9
Barkerville, B. C	......	......	......	......	......	......	......	......	......	......
Hamilton, Bermuda	29.91	30.07	−.01	61.8	− 0.4	66.8	56.8	4.33	−0.80	0.0

TABLE VII.—*Heights of rivers referred to zeros of gages, March, 1902.*

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water. Height.	Highest water. Date.	Lowest water. Height.	Lowest water. Date.	Mean stage.	Monthly range.
	Miles.	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Mississippi River.								
St. Paul, Minn.[1]	1,954	14	2.8	27	1.1	10	2.0	1.7
Reeds Landing, Minn	1,884	12	2.4	31	—0.1	1	1.3	2.5
La Crosse, Wis	1,819	12	4.7	3	2.6	19	3.8	2.1
Prairie du Chien, Wis.[1]	1,759	18	5.5	14	3.5	22	4.3	2.0
Dubuque, Iowa[1]	1,699	15	7.1	12	3.5	21, 22	5.0	3.6
Leclaire, Iowa[2]	1,609	10	4.6	14	1.9	22, 23	3.2	2.7
Davenport, Iowa[3]	1,593	15	7.1	7	3.2	24	4.7	3.9
Muscatine, Iowa	1,562	16	7.2	4	4.0	24, 25	5.6	3.2
Galland, Iowa[4]	1,472	8	3.2	16, 17	1.6	26	2.5	1.6
Keokuk, Iowa[4]	1,463	15	6.0	5	2.5	25–27	3.9	3.5
Hannibal, Mo.[5]	1,402	13	5.8	17, 18	3.2	27, 28	4.7	2.6
Grafton, Ill	1,306	23	8.6	14	2.7	1, 3, 4	6.4	5.9
St. Louis, Mo	1,264	30	13.4	17	3.8	1	8.6	9.6
Chester, Ill	1,189	30	10.3	18	2.6	1	6.7	7.7
New Madrid, Mo	1,003	34	33.2	17, 18	13.8	1	27.5	19.4
Memphis, Tenn	843	33	30.8	20, 21	6.6	1	24.4	24.2
Helena, Ark	767	42	39.6	23, 24	10.6	1	31.7	29.0
Arkansas City, Ark	635	42	41.4	28, 29	12.4	1	32.1	29.0
Greenville, Miss	595	42	36.0	29	10.7	1	27.3	25.3
Vicksburg, Miss	474	45	40.8	30, 31	12.9	3	29.3	27.9
New Orleans, La	108	16	14.0	30	5.2	7	9.6	8.8
Missouri River.								
Bismarck, N. Dak	1,309	14	9.6	19, 20	2.6	1	7.3	7.0
Pierre, S. Dak.[1]	1,114	14	9.8	20	3.5	13	5.6	6.3
Sioux City, Iowa[2]	784	19	11.4	31	4.7	19	7.3	6.7
Omaha, Nebr	669	18	9.3	31	5.2	21	7.1	4.1
Plattsmouth, Nebr	641	17	7.7	5	2.9	21	4.9	4.8
St. Joseph, Mo	481	10	4.8	30	1.0	23	3.0	3.8
Kansas City, Mo	388	21	11.8	31	7.5	25	9.4	4.3
Boonville, Mo	199	20	9.3	14	6.2	3	7.7	3.1
Hermann, Mo	103	24	11.4	15, 16	4.3	1	7.4	7.1
Osage River.								
Bagnell, Mo	70	28	17.7	14	2.4	11	6.3	15.3
Illinois River.								
Peoria, Ill	135	14	12.3	20–22	8.4	1	10.9	3.9
Youghiogheny River.								
Confluence, Pa	59	10	9.9	1	1.7	28	4.0	8.2
West Newton, Pa	15	23	21.0	1	1.9	28	5.9	19.1
Allegheny River.								
Warren, Pa	177	14	13.5	2	2.2	30, 31	5.7	11.3
Oil City, Pa	123	13	15.4	1	2.7	28, 29	6.3	12.7
Parker, Pa	73	20	19.5	1	2.5	28	6.8	17.0
Monongahela River.								
Weston, W. Va	161	18	8.3	9	0.0	22–28	1.2	8.3
Fairmont, W. Va	119	25	15.0	1	2.0	28–29	5.3	13.0
Greensboro, Pa	81	18	22.7	1	8.1	28	11.3	14.6
Lock No. 4, Pa	40	28	30.0	1	7.6	28	13.5	22.4
Conemaugh River.								
Johnstown, Pa	64	7	10.8	1	2.6	26–28	4.7	8.2
Red Bank Creek.								
Brookville, Pa	35	8	6.7	1	0.2	27–31	1.7	6.5
Beaver River.								
Elwood Junction, Pa	10	14	10.0	1	4.2	27	5.0	5.8
Great Kanawha, River.								
Charleston, W. Va	58	30	37.0	1	5.7	27	11.8	31.3
Little Kanawha River.								
Glenville, W. Va	103	20	12.4	9	0.0	27, 28	2.8	12.4
New River.								
Hinton, W. Va	95	14	17.0	1	2.9	28	5.4	14.1
Cheat River.								
Rowlesburg, W. Va	36	14	10.0	1	2.6	26–28	4.9	7.4
Ohio River.								
Pittsburg, Pa	966	22	32.4	1	4.3	28	12.2	28.1
Davis Island Dam, Pa	960	25	29.0	2	6.6	28	12.7	22.4
Wheeling, W. Va	875	36	42.0	2, 3	7.9	28	18.8	34.1
Parkersburg, W. Va	785	36	40.0	4	8.0	27, 28	20.2	32.0
Point Pleasant, W. Va	703	39	46.3	3	10.0	29	27.5	36.3
Huntington, W. Va	660	50	49.5	3	13.8	29	32.5	35.7
Catlettsburg, Ky	651	50	50.7	3	13.7	28, 29	33.5	37.0
Portsmouth, Ohio	612	50	50.4	3	14.3	29	34.6	36.1
Cincinnati, Ohio	499	50	50.9	5	16.4	29	37.2	34.5
Madison, Ind	413	46	41.8	8	15.7	29	32.1	26.1
Louisville, Ky	367	28	24.8	9	7.7	30	15.9	17.1
Evansville, Ind	184	35	40.0	11	16.1	1	31.5	23.9
Paducah, Ky	47	40	39.7	15, 16	16.1	1	31.8	23.6
Cairo, Ill	1,073	45	42.2	17	18.4	1	34.8	23.8
Muskingum River.								
Zanesville, Ohio	70	20	16.0	1	7.1	27, 28	10.7	8.9
Scioto River.								
Columbus, Ohio[6]	110	17	4.4	1	2.0	28	2.8	2.4
Miami River.								
Dayton, Ohio	77	18	2.6	31	1.1	6, 7	1.6	1.5
Wabash River.								
Mount Carmel, Ill	50	15	11.8	4	4.3	29	8.0	7.5
Licking River.								
Falmouth, Ky	30	25	15.0	10	4.0	6	7.8	11.0
Kentucky River.								
Frankfort, Ky	65	31	19.4	31	7.0	26–28	11.1	12.4
Clinch River.								
Speers Ferry, Va	156	20	23.6	1	0.6	27, 28	4.3	23.0
Clinton, Tenn	52	25	32.5	2	6.2	28	14.5	26.3
Holston River.								
Rogersville, Tenn[7]	103	14	10.6	30	2.9	28	4.5	7.7
French Broad River.								
Leadvale, Tenn[7]	70	15	7.0	29	0.4	26–28	2.2	6.6
Tennessee River.								
Knoxville, Tenn	635	29	36.1	1	3.9	28	10.0	32.2
Kingston, Tenn	556	25	28.8	2	4.2	28	10.9	24.6
Chattanooga, Tenn	452	33	38.0	4	7.2	28	17.6	30.8
Bridgeport, Ala	402	24	26.5	5	5.6	28	13.7	20.9
Tennessee River.—Cont'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Florence, Ala	255	16	22.5	29	7.1	27	13.8	15.4
Riverton, Ala	225	25	33.2	10	9.7	27	21.7	23.5
Johnsonville, Tenn	95	24	34.4	31	12.0	27, 28	22.9	22.4
Cumberland River.								
Burnside, Ky	516	50	65.0	29	4.7	28	17.3	60.3
Carthage, Tenn	305	40	50.4	31	5.8	27	19.2	44.6
Nashville, Tenn	189	40	44.7	31	9.9	27	23.4	34.8
Clarksville, Tenn	126	42	48.6	31	13.4	28	28.4	35.2
Arkansas River.								
Wichita, Kans	832	10	2.0	1	1.4	11, 17-20, 29–31	1.5	0.6
Webbers Falls, Ind. T	465	23	14.7	14	2.1	10	5.0	12.6
Fort Smith, Ark	403	22	15.1	14	2.4	11	6.2	12.7
Dardanelle, Ark	256	21	14.8	15	2.5	2	6.3	12.3
Little Rock, Ark	176	23	16.0	16	5.2	12	9.0	10.8
White River.								
Newport, Ark	150	26	18.1	2	3.9	26	9.9	14.2
Yazoo River.								
Yazoo City, Miss	80	25	24.8	28, 29	16.6	2–4	18.4	8.2
Red River.								
Arthur City, Tex	638	27	9.0	13	2.5	2–11	5.0	6.5
Fulton, Ark	515	28	17.8	30, 31	6.0	10, 11	11.5	11.8
Shreveport, La	327	29	14.0	29, 30	4.4	15	8.4	9.6
Alexandria, La	118	33	15.2	31	5.2	1	8.5	10.0
Ouachita River.								
Camden, Ark	304	39	33.4	31	10.9	21	19.2	22.5
Monroe, La	122	40	28.8	31	21.0	1	23.7	7.8
Atchafalaya River.								
Melville, La	100	31	32.0	31	19.0	5, 6	25.8	13.0
Susquehanna River.								
Wilkesbarre, Pa	183	14	27.3	2	3.2	31	11.5	24.1
Harrisburg, Pa	69	17	23.9	2	3.7	27, 28	10.3	20.2
West Branch Susquehanna.								
Williamsport, Pa	39	20	21.7	1	3.7	28	8.7	18.0
Juniata River.								
Huntingdon, Pa	90	24	13.0	1	4.6	27–30	5.9	8.4
Potomac River.								
Cumberland, Md	290	8	11.5	1	3.7	27	5.6	7.8
Harpers Ferry, W. Va	172	18	27.0	2	4.0	26–29	9.7	23.0
James River.								
Lynchburg, Va	260	18	.....	.....	.....	.....	.....	.....
Richmond, Va	111	12	19.0	2	0.9	26	4.4	18.1
Roanoke River.								
Weldon, N. C	129	30	38.9	1	10.7	28	18.1	28.2
Cape Fear River.								
Fayetteville, N. C	112	38	41.7	2	7.2	28	16.3	34.5
Edisto River.								
Edisto, S. C	75	6	5.8	5	3.7	28	4.4	2.1
Pedee River.								
Cheraw, S. C	149	27	30.9	3	4.9	28	12.7	26.0
Black River.								
Kingstree, S. C	52	12	10.0	5, 6	7.3	31	8.6	2.7
Lynch Creek.								
Effingham, S. C	35	12	13.2	7	6.3	29	9.4	6.9
Santee River.								
St. Stephens, S. C	97	12	15.0	9	8.3	1	9.9	6.7
Congaree River.								
Columbia, S. C	37	15	22.0	2	2.5	28	6.3	19.5
Wateree River.								
Camden, S. C	45	24	29.5	2	9.1	28	15.4	20.4
Waccamaw River.								
Conway, S. C	40	7	7.2	13	5.0	29, 31	6.2	2.2
Savannah River.								
Calhoun Falls, S. C	347	15	16.0	1	3.7	12, 26, 27	5.1	12.3
Augusta, Ga	268	32	34.6	1	11.8	27, 28	17.6	22.8
Broad River.								
Carlton, Ga	30	11	23.2	1	3.5	25–27	5.8	19.7
Flint River.								
Albany, Ga	80	20	22.2	7	7.2	31	12.6	15.0
Chattahoochee River.								
Westpoint, Ga	239	20	20.0	1	4.9	12, 23	9.1	15.1
Ocmulgee River.								
Macon, Ga	125	18	22.8	1	7.5	13	11.6	15.3
Oconee River.								
Dublin, Ga	79	30	25.8	5	6.0	14	14.4	19.8
Coosa River.								
Rome, Ga	271	30	29.3	1	4.2	27	11.6	25.1
Gadsden, Ga	144	18	22.7	6	5.8	26, 27	13.3	16.9
Alabama River.								
Montgomery, Ala	265	35	47.8	31	13.8	15	28.9	34.0
Selma, Ala	212	35	48.9	31	19.2	15	33.6	29.7
Tombigbee River.								
Columbus, Miss	303	33	30.6	31	3.5	23	9.6	27.1
Demopolis, Ala[8]	155	35	55.6	31	24.0	24	33.9	31.6
Black Warrior River.								
Tuscaloosa, Ala	90	43	60.6	29	13.8	24	31.0	46.8
Brazos River.								
Kopperl, Tex	369	21	4.4	15	—1.6	1–11	—0.2	6.0
Waco, Tex	301	22	5.4	16	0.9	1–12	2.8	4.5
Booth, Tex	76	39	3.0	22	—0.6	1–17	0.6	3.6
Red River of the North.								
Moorhead, Minn	418	26	10.3	17, 18	8.3	10, 11	9.1	2.0
Columbia River.								
Umatilla, Oreg	270	25	4.9	1	2.0	31	3.1	2.9
The Dalles, Oreg	166	40	7.9	1	3.4	31	5.2	4.5
Willamette River.								
Albany, Oreg	118	20	13.4	1	6.2	29	8.4	7.2
Portland, Oreg	12	15	10.0	1, 2	4.2	31	7.4	5.8
Sacramento River.								
Red Bluff, Cal	265	23	16.6	1	4.7	30, 31	9.3	11.9
Sacramento, Cal	64	29	28.2	1	20.5	31	23.3	7.7

[1] Frozen for 11 days. [2] Frozen for 9 days. [3] Frozen for 5 days. [4] Frozen for 4 days. [5] Frozen for 6 days. [6] Frozen for 2 days. [7] 22 days only. [8] 30 days only.

CLIMATOLOGY OF COSTA RICA.

Communicated by H. PITTIER, Director, Physical Geographic Institute.

TABLE 1.—*Hourly observations at the Observatory, San Jose de Costa Rica, during March, 1902.*

Hours.	Pressure. Observed, 1902.	Pressure. Normal, 1889-1900.	Temperature. Observed, 1902.	Temperature. Normal, 1889-1900.	Relative humidity. Observed, 1902.	Relative humidity. Normal, 1889-1900.	Rainfall. Observed, 1902.	Rainfall. Normal, 1889-1900.	Rainfall. Duration, 1902.
	660+ *Mm.*	660+ *Mm.*	° *C.*	° *C.*	%	%	*Mm.*	*Mm.*	*Hrs.*
1 a. m	4.17	4.12	16.60	16.32	80	84	0.0	0.1	0.00
2 a. m	3.74	3.65	16.42	16.56	80	84	0.0	0.1	0.00
3 a. m	3.51	3.31	15.85	16.37	82	85	0.0	0.0	0.00
4 a. m	3.42	3.15	15.46	16.20	84	85	0.0	0.0	0.00
5 a. m	3.51	3.25	15.37	16.05	84	84	0.0	0.0	0.00
6 a. m	3.71	3.55	15.28	15.97	84	84	0.0	0.0	0.00
7 a. m	4.04	4.01	15.62	16.20	82	83	0.0	0.0	0.00
8 a. m	4.34	4.43	17.26	17.78	72	77	0.0	0.0	0.00
9 a. m	4.61	4.74	20.02	19.98	63	68	0.0	0.0	0.00
10 a. m	4.79	4.76	22.56	22.62	58	62	1.6	0.0	0.25
11 a. m	4.65	4.56	24.18	24.40	58	55	2.7	0.0	0.92
12 m	4.36	4.22	25.44	25.41	49	53	8.3	0.0	0.58
1 p. m	3.85	3.74	25.94	26.39	50	51	1.1	0.1	1.00
2 p. m	3.33	3.11	25.86	26.37	47	52	4.4	1.1	1.00
3 p. m	2.85	2.74	25.79	25.30	49	54	0.4	1.2	0.41
4 p. m	2.70	2.41	24.30	24.10	56	59	0.2	2.3	0.25
5 p. m	2.65	2.48	22.24	21.25	62	64	2.3	1.8	0.67
6 p. m	2.91	2.77	20.74	20.13	70	71	1.1	1.3	1.00
7 p. m	3.34	3.23	19.35	19.27	78	77	1.2	3.1	1.00
8 p. m	3.72	3.73	18.55	18.57	78	80	0.0	0.8	0.00
9 p. m	4.17	4.15	18.03	18.15	79	81	0.0	0.6	0.00
10 p. m	4.44	4.44	17.65	17.90	79	83	0.8	0.9	0.92
11 p. m	4.59	4.58	17.30	17.31	78	83	0.8	0.3	1.00
Midnight	4.55	4.52	16.80	17.10	79	83	0.2	0.5	1.00
Mean	663.83	668.60	19.69	19.82	70	73			
Minimum	661.50	659.93	12.8	9.9	20				
Maximum	666.80	667.22	29.7	32.6	97		8.3		
Total							25.0	14.2	10.09

REMARKS.—At San Jose the barometer is 1,169 meters above sea level. Readings are corrected for gravity, temperature, and instrumental error. The hourly readings for pressure, and wet and dry bulb thermometers, are obtained by means of Richard registering instruments, checked by direct observations every three hours from 7 a. m. to 10 p. m. The thermometers are 1.5 meters above ground and are corrected for instrumental errors. The hourly rainfall is as given by Hottinger's self-register, checked once a day. Under maximum, the greatest hourly rainfall for the month is given. The standard rain gage is 1.5 meters above ground. Since January 1, 1902, observations at San Jose have been made on seventy-fifth meridian time, which is 0 hours, 36 minutes, 13.3 seconds *in advance* of San Jose local time. The normals for pressure, temperature, and relative humidity have been adjusted to this time; the normal for rainfall in Table 1 and the sunshine observations and normal in Table 2 refer to local time. At Port Limon the hours of direct observation are 8 a. m., 2 and 8 p. m., San Jose local time; the barometer is 3.4 meters above sea level. The means for temperature and relative humidity in Table 4 are obtained from two-hourly readings given by a Richard self-registering thermometer.

TABLE 2.

Time.	Sunshine. Observed, 1902.	Sunshine. Normal, 1889-1900.	Cloudiness. Observed, 1902.	Cloudiness. Normal, 1889-1900.	Temperature of the soil at depth of— 0.15 m.	0.30 m.	0.60 m.	1.20 m.	3.00 m.
	Hours.	*Hours.*	%	%	° *C.*	° *C.*	° *C.*	° *C.*	° *C.*
7 a. m	19.81	12.94	30	35	21.12	21.56	21.91	20.93	20.59
8 a. m	28.38	23.80							
9 a. m	25.60	23.77							
10 a. m	25.73	22.72	42	42	21.35	21.55	21.90	20.91	
11 a. m	24.33	22.25							
12 m	22.91	21.78							
1 p. m	22.28	22.07	49	49	22.04	21.81	21.95	20.94	
2 p. m	24.66	22.64							
3 p. m	26.91	20.74							
4 p. m	24.46	17.64	53	60	22.37	21.97	21.61	20.93	
5 p. m	19.55	12.90							
6 p. m	12.11	4.73							
7 p. m			58	58	22.27	21.98	21.94	20.93	
8 p. m									
9 p. m									
10 p. m			43	44	21.99	21.94	21.93	20.94	
11 p. m									
Midnight									
Mean			45	48	21.87	21.81	21.92	20.93	20.59
Total	276.73	227.98							

TABLE 3.—*Rainfall at stations in Costa Rica, March, 1902.*

Stations.	Height above sea level.	Observed, 1902. Amount.	Observed, 1902. Number of days.	Normals. Number of years.	Normals. Amount.	Normals. Number of days.
	Meters.	*Mm.*			*Mm.*	
Sipurio (Talamanca)	60	94	10	1	149	12
Boca Banano	3	168	14	6	199	18
Limon	3	171	14	7	198	18
Swamp Mouth	3	264	13	4	239	13
Zent	20	300	13	1		
Siquirres	60	160	8	3	190	11
Guapiles	300	187	12	1	60	12
Cariblanco (Sarapiqui)	835	143	12	4	153	15
San Carlos	161	50	9	3	74	11
Las Lomas	266	47	8	1	181	14
Peralta	332	115	8	4	151	14
Turrialba	620	25	8	7	80	12
Juan Viñas	1,040	25	2	6	75	5
Santiago	1,100	99	4	1		
Paraiso	1,336	33	4	9 mo.		
Cachi	1,020	62	8	4 mo.		
Orosi	1,068					
Las Concavas		39	9	9 mo.		
Cartago	1,450	11	3	3	30	6
Tres Rios	1,300	20	4	13	12	12
San Francisco Guad	1,187	26	4	6	18	2
San Jose	1,160	25	4	13	17	2
La Verbena	1,140	12	4	6	14	2
Nuestro Amo		4	3	6	74	3
Alajuela	950	68	7	1	2	1
San Isidro Alajuela	1,346	124	9	1		

TABLE 4.—*Observations taken at Port Limon and Zent, March, 1902.*

Stations.	Pressure. Minimum.	Pressure. Maximum.	Pressure. Mean.	Temperature. Minimum.	Temperature. Maximum.	Temperature. Mean.	Relative humidity.
	Inches.	*Inches.*	*Inches.*	°	°	°	%
Port Limon	762.7	768.9	765.07	20.1	35.2	25.39	81
Zent				15.4	36.0	26.08	75

Stations.	Cloudiness.	Sunshine.	Rainfall. Amount.	Rainfall. Number of days.	Temperature of soil at depth of— 0.15 *m.*	0.30 *m.*	0.60 *m.*
	%	*Hours.*	*Mm.*		°	°	°
Port Limon	61		171	14			
Zent	55	187.55	300	13	27.68	27.43	27.82

MEXICAN CLIMATOLOGICAL DATA.

By Señor MANUEL E. PASTRANA, Director of the Central Meteorologic-Magnetic Observatory.

March, 1902.

Stations.	Altitude.	Mean barometer.	Temperature. Max.	Temperature. Min.	Temperature. Mean.	Relative humidity.	Precipitation.	Prevailing direction. Wind.	Prevailing direction. Cloud.
	Feet.	*Inch.*	° *F.*	° *F.*	° *F.*	%	*Inch.*		
Chihuahua	4,669	25.16	78.8	33.8	57.2	32		w.	
Guadalajara (Obs. del. Est.)	5,186	24.87	84.2	48.0	65.8	42		nw.	
Guanajuato	6,640	23.57	87.8	41.4	64.6	44		w.	
Leon (Guanajuato)	5,906	24.22	85.1	41.4	64.0	47	0.03	nw.	
Mazatlan	25	29.90	81.7	56.8	66.6	75		nw.	
Merida	50								
Mexico (Obs. Cent.)	7,472	22.91	82.4	40.1	62.1	39	T.	s.	sw.
Monterrey (Sem.)	1,626								
Morelia (Seminario)	6,401	23.90	80.6	44.6	62.8	46	T.	sw.	sw.
Puebla (Col. Cat.)	7,125	23.28	79.3	41.4	56.3	52	0.02	ne.	
Puebla (Col. d Est.)	7,118	23.29	80.1	33.6	59.9	52	0.04	ene.	
Queretaro	6,070								
Saltillo (Col. S. Juan)	5,399	24.68	81.9	36.1	60.4	49		nne.	
S. Isidro (Hac. de Gto.)			74.3	51.8				w.	
Toluca	8,812	21.90	76.1	32.9	55.0	42	0.06	w.	
Zapotlan	5,078	25.02	84.2	44.6	65.8	50		sse.	

Chart I. Tracks of Centers of High Areas. March, 1902.

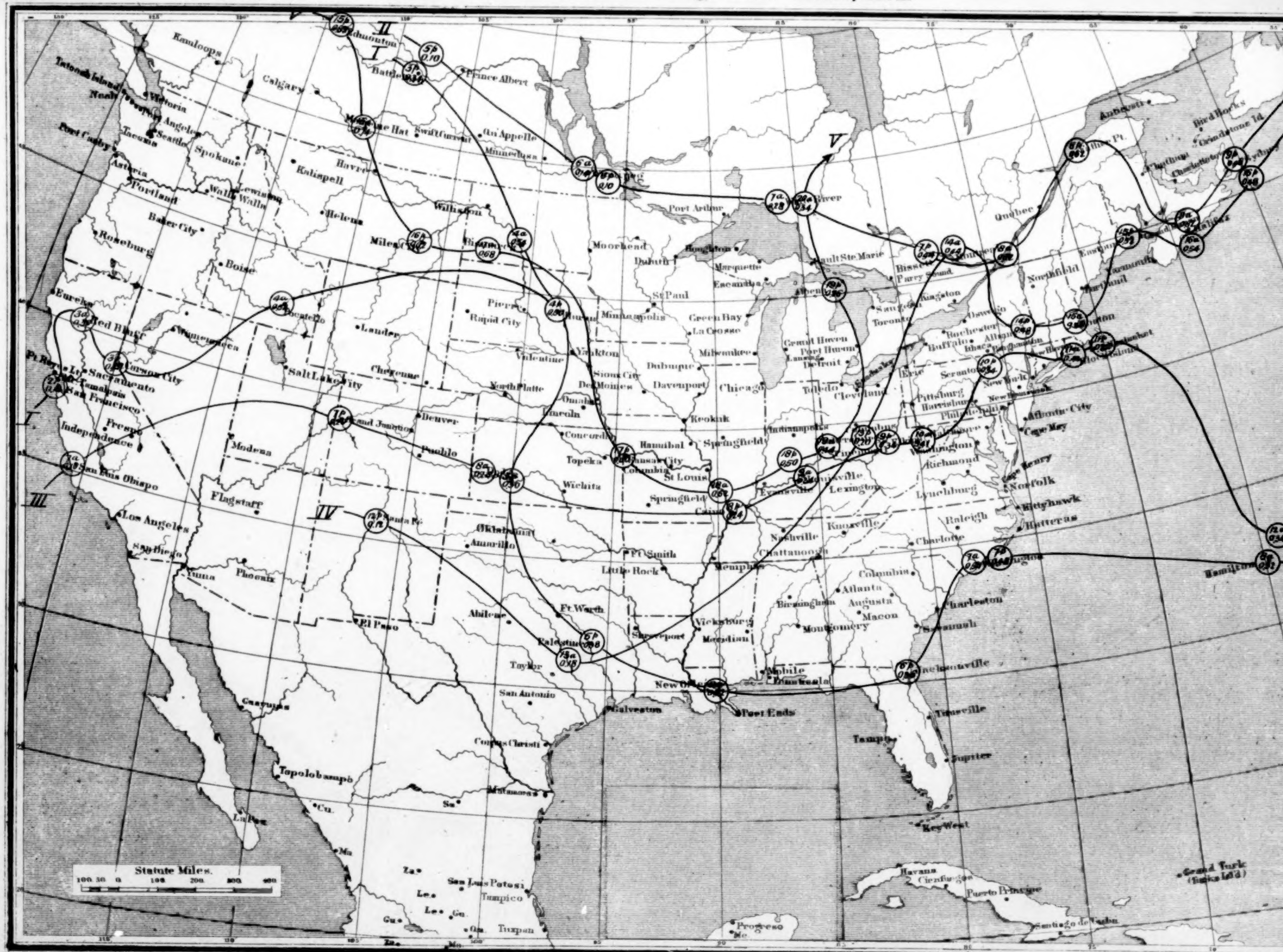

Chart II. Tracks of Centers of Low Areas. March, 1902.

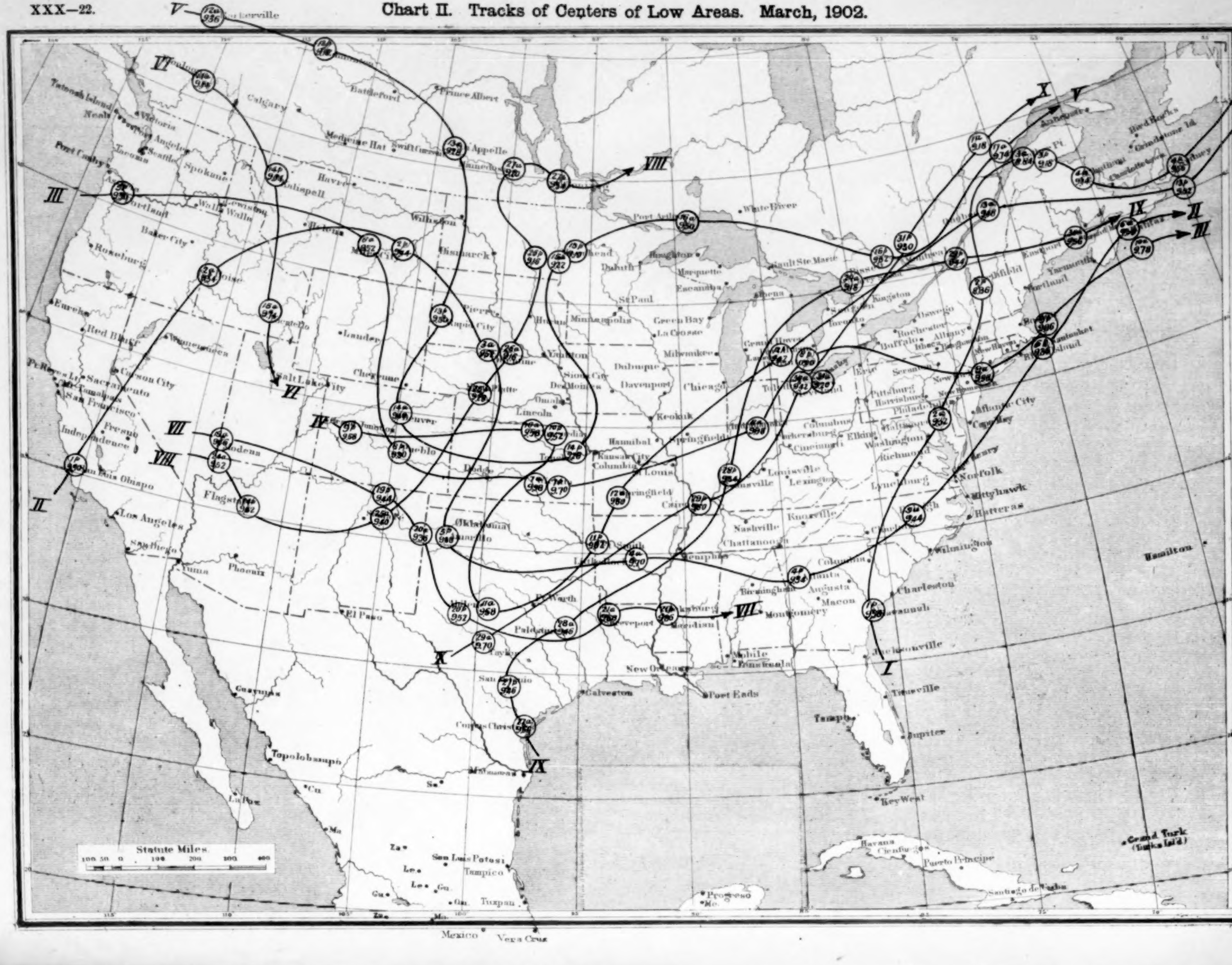

Chart III. Total Precipitation. March, 1902.

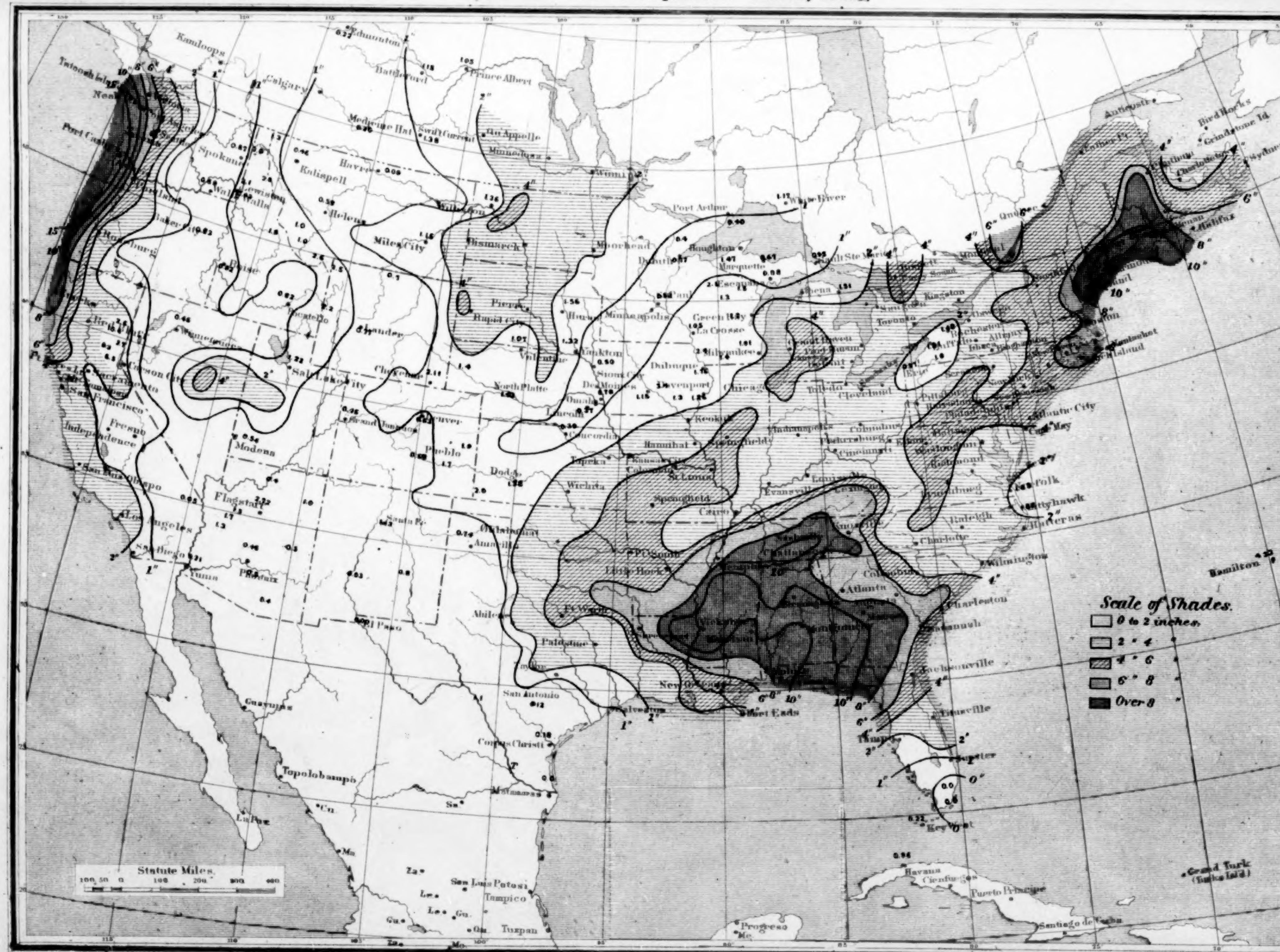

Chart IV. Sea-Level Pressure; Resultant Surface Winds. March, 1902.

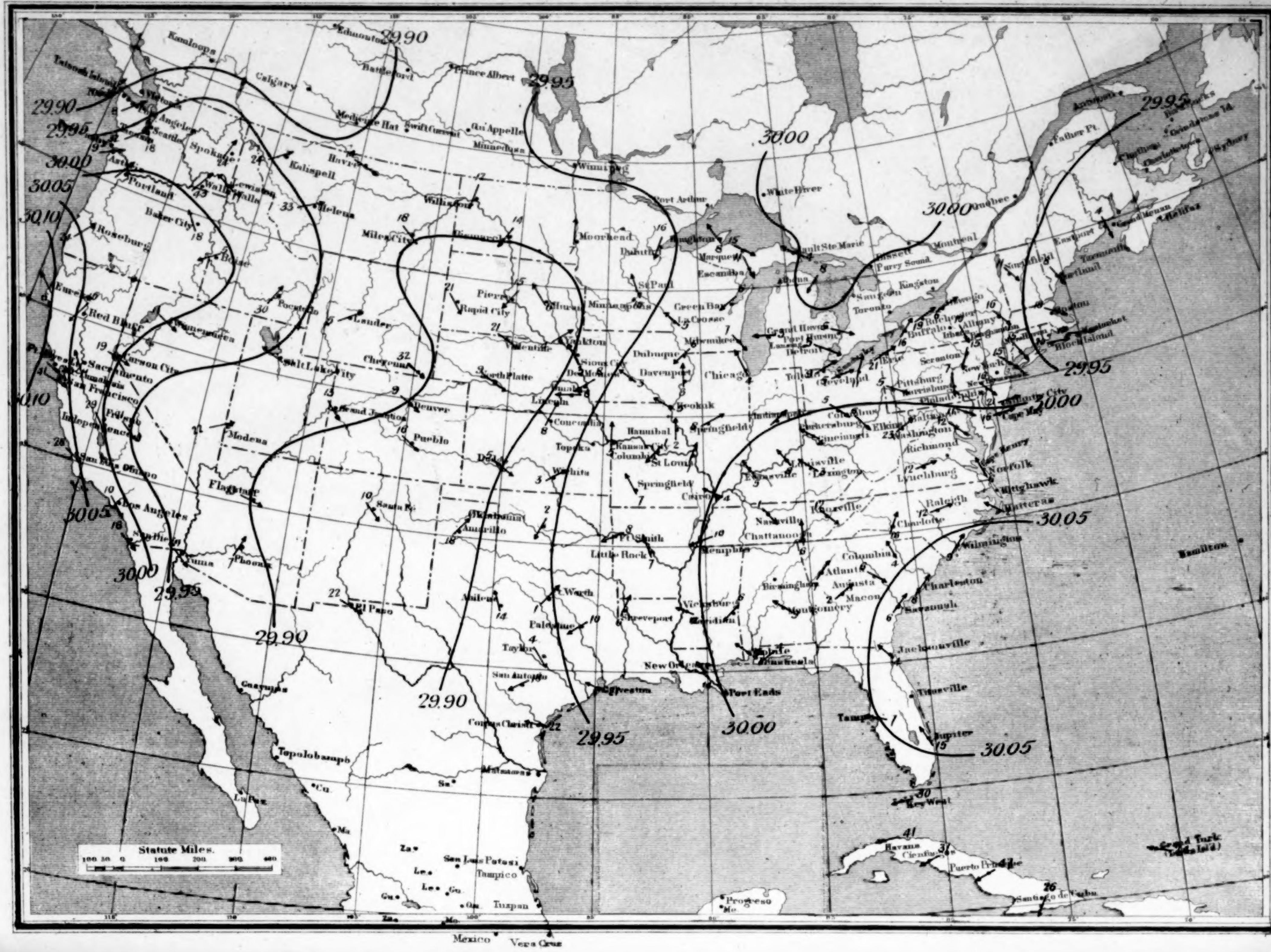

Chart V. Hydrographs for Seven Principal Rivers of the United States. March, 1902.

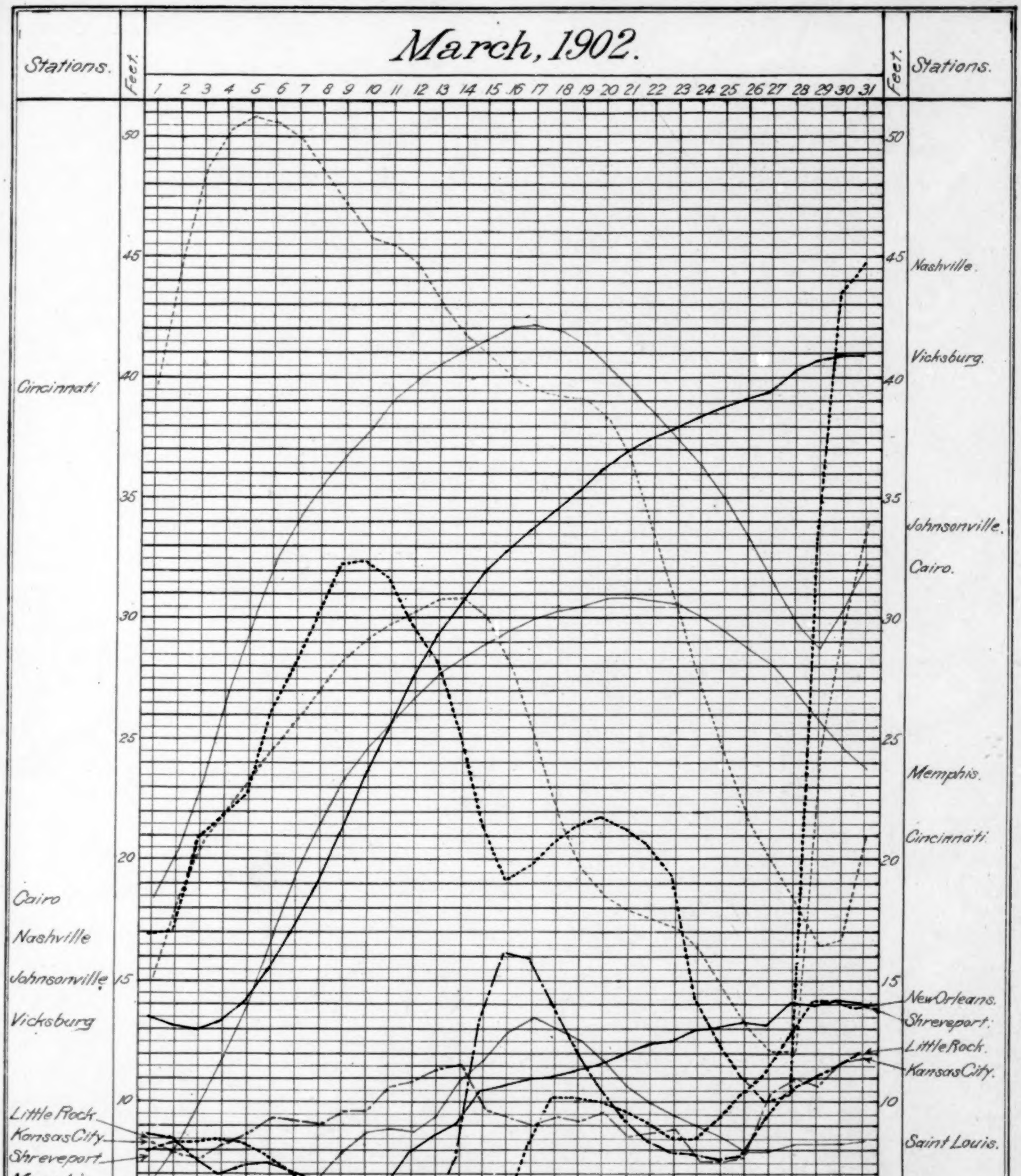

Chart VI. Surface Temperatures; Maximum, Minimum, and Mean. March, 1902.

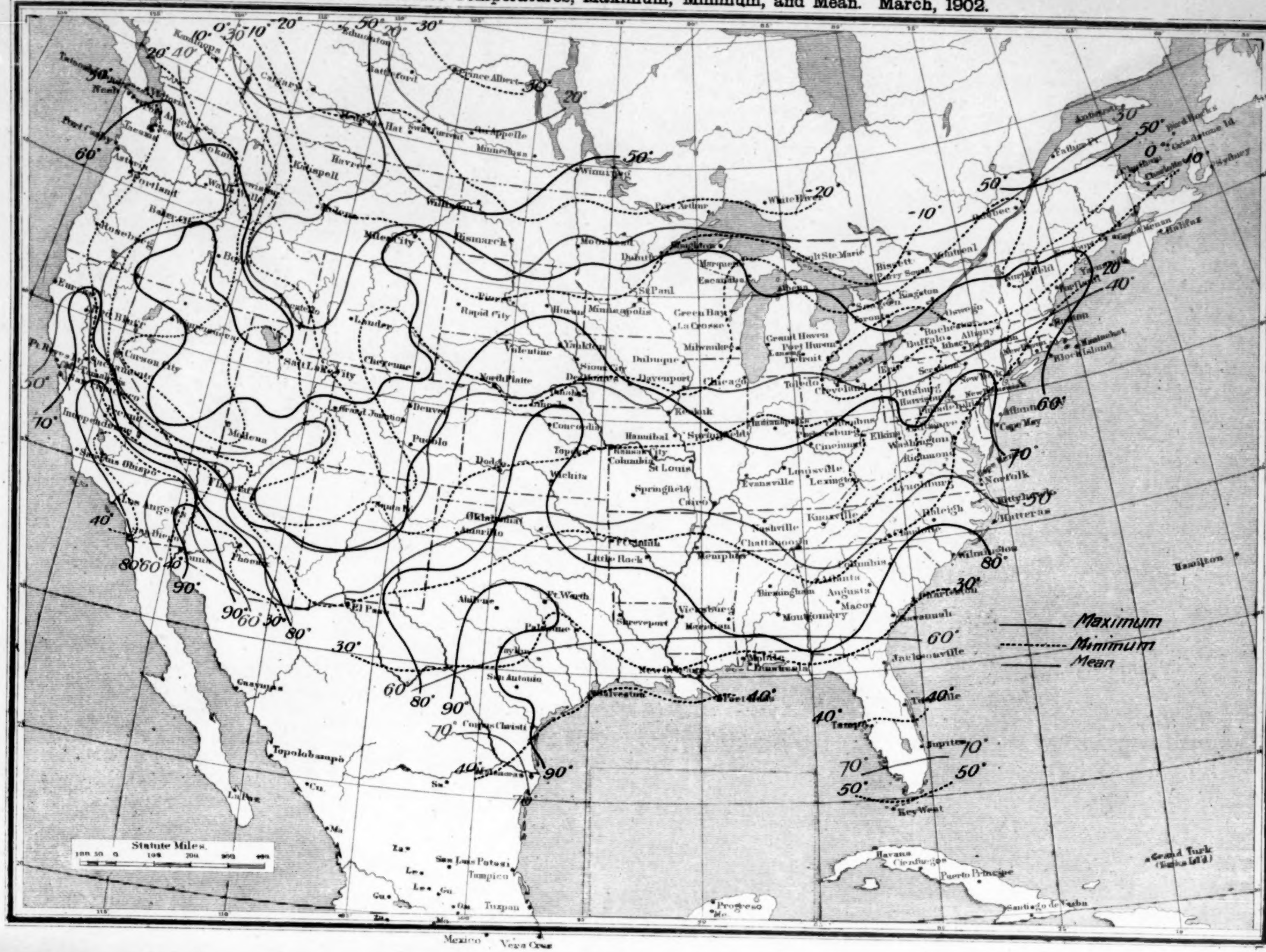

Chart VII. Percentage of Sunshine. March, 1902.

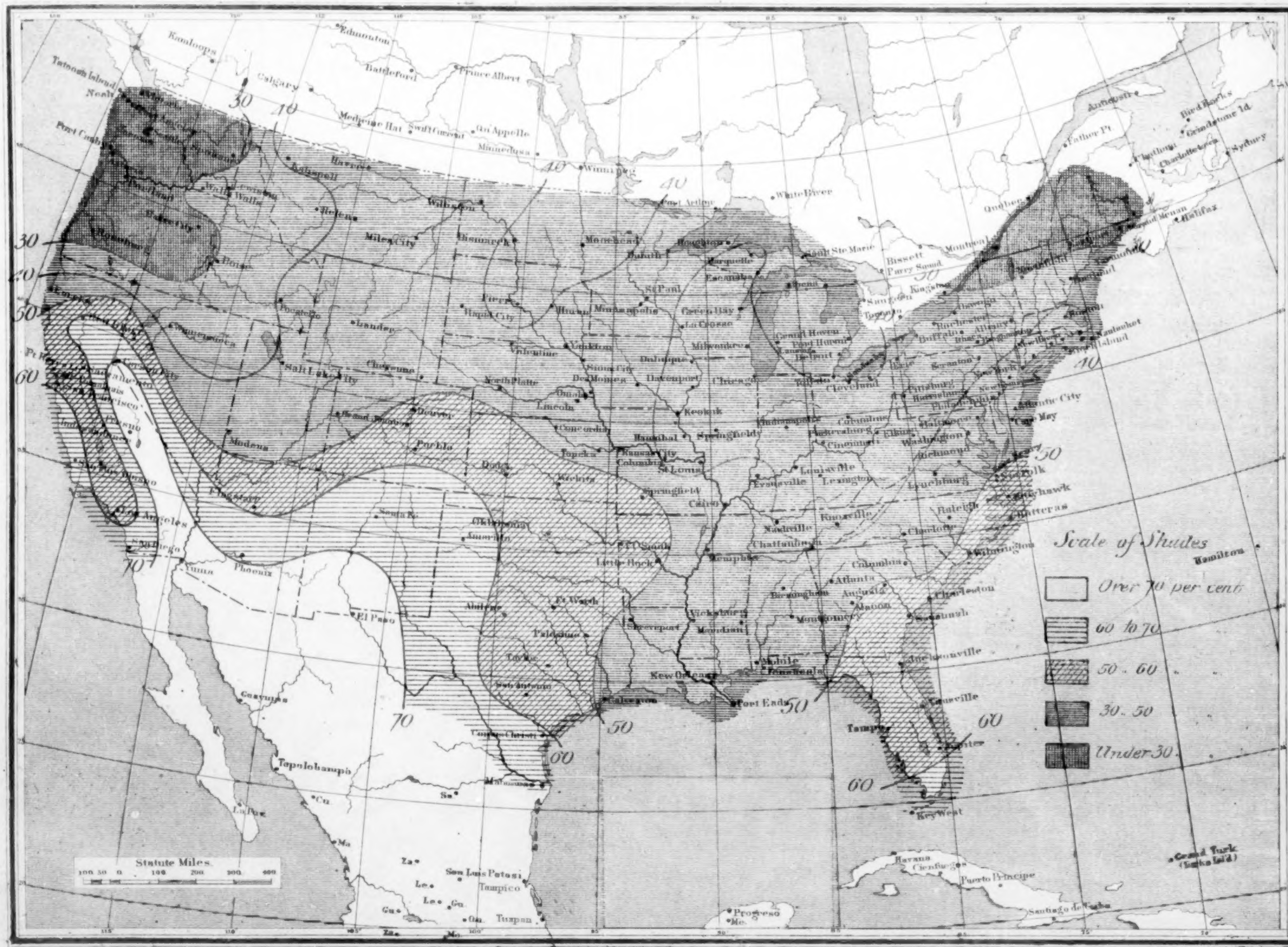

Chart VIII. West Indian Monthly Isobars, Isotherms, and Resultant Winds. March, 1902.

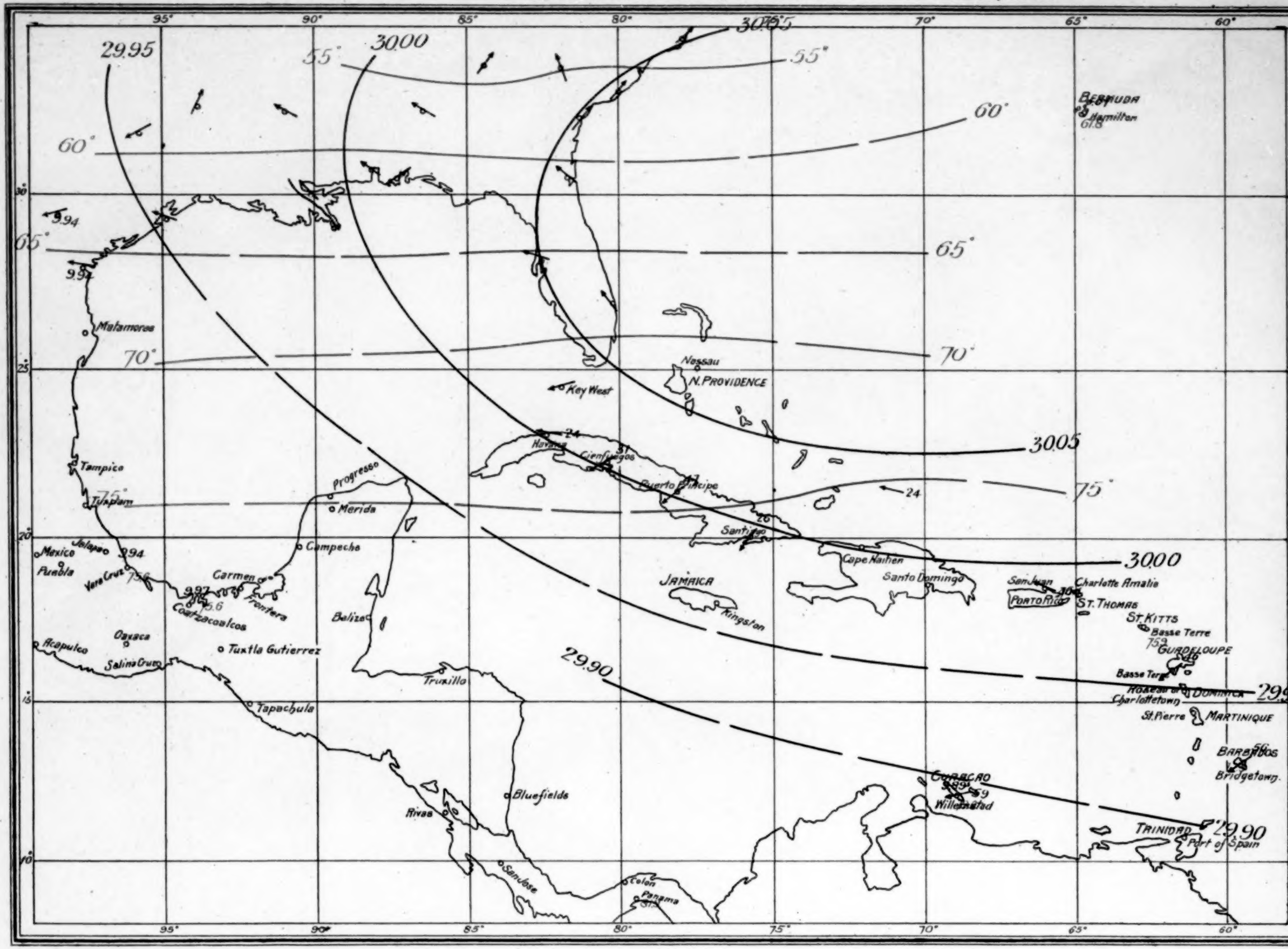

Chart IX. Total Snowfall for March, 1902.